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The Cold War

WE have long believed that the distinction between a cold war and a shooting war was a distinction without merit. Both are instruments of diplomacy. Both depend on force. Violence and bloodshed vary only in degree. To the Soviet, a cold war is a war of minimum risk with gains which in many respects are superior to those realized in successful conventional wars of conquest.

Every mature person knew that the Republican forces in Spain during the Civil War were led by Soviet officers, that they were thoroughly covered by the NKVD and that the bulk of the supplies, equipment, and money came from the Kremlin. Thanks to an excellent propaganda job, many people still regard the Red legions of the Republican Army as the defenders of freedom and democracy. Russia on that occasion played for high stakes but, having lost, suffered little embarrassment. Diplomatic usage in this instance accepted the fiction of communist anonymity.

This technique of using a native front, operating under appealing symbols, has had some failures—Greece, Italy, Iran, Germany, Austria. Against these must be ranked Rumania, Bulgaria, Jugoslavia, Hungary, Poland and Czechoslovakia. The greatest of all these riskless conquests is now taking place in China and in the process the West may be receiving a blow that could be fatal.

If China passes within the orbit of the Kremlin, Red forces will stand at the border of a defenseless India whose population masses and appalling poverty make her peculiarly susceptible to the cold conquests of communism. This would bring the balance of world population under Russian dominion. For the first time, the West would stand at bay with a minority of the world's population. In view of the paralyzing fifth columns which operate in all the free nations, this would give the communists a formidable advantage.

In fact, so good a soldier and strategist as General Chennault believes that the major immediate objective of the Reds is not Germany, as so many students believe, but rather Asia. He believes the bluster and provocations in the West are merely a holding action to divert the attention of the bourgeois adversary and induce him to commit his major strength on a front which Stalin has no intention of attacking. Whether this is his real purpose or not, the fact is that we have left Asia completely exposed and the communists are capitalizing on our failure.

Their success in China and the danger to our eastern defenses which it poses challenges the soundness of the American policy of containment. Under this policy our government proposed to meet every outward pressure of Soviet expansion with irresistible force. Greece, Iran, Berlin are illustrations. Marshall has let it be known that this policy applies only to the Western Hemisphere and Europe and does not include the Orient.

It is a little difficult for a layman to see how the water in a bucket can be "contained" if only the holes on one side are patched. Such a policy imposes an enormous strain on the "containing power" and tends to dissipate his forces. Assuming no final climactic clash between the two antagonists directly, the effort to throw a few American soldiers plus a few billion dollars at every threatened point seems like a sure formula of exhaustion. Can this country sustain a duel of "infinite duration" with an opponent who knows no rules, whose strength seems to grow with time?

Joseph Stagg Lawrence

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RYERSON STEEL

► Three big points emerged from the CIO's Portland convention. They called for (1) general housecleaning of Communists, (2) total repeal of the Taft-Hartley law and (3) fourth round wage increases. Not to be overlooked is Philip Murray's strong stand on social insurance and pensions in his opening address. These are not new aims, but Mr. Murray feels the time is ripe. He will press those points when he sits at the bargaining table next year.

► Conversion steel deals in the oil and gas fields are still stronger than ever. Quality ingots for conversion into plates or tube rounds command $100 or more per ton. Special plates for pipe making, however, bring anywhere from $140 to $205 per ton in some cases. To this naturally must be added the normal costs for converting plates or rounds into finished pipe.

► The Office of Defense Transportation has advised the railroad industry that it hopes to obtain enough steel to produce 12,000 new freight cars a month. This would mean that steelmakers would have to consent to allot more steel for the expanded program. But it won't affect other steel consumers at all--not until carbuilders have the orders permitting them to build cars at a faster rate than they are right now.

► Experiments have proved the feasibility of induction hardening ways of machine tools. The chief difficulty to date, however, has been working out the induction coil arrangements so as to provide uniform heating of the way area over its entire length.

► The use of specialized shipping boxes and cartons is saving the automotive industry thousands of dollars. A truck maker reports a saving of $38,000 every time he ships 27,000 engines on special pallets. The use of expendable paper cartons is increasing. These pallets are being used to package speedometers, brake assemblies, batteries, bearings and other supplies.

► Carbon steel spring wire has been easing in some areas. Now the first evidence of a similar condition in the manufacturers bright wire is beginning to appear. Nails continue to be tight and all nail production equipment is in operation at maximum capacity. Now General Motors is establishing a wire plant to produce seat springs with zig-zag spring construction for their class A cars. Industry members feel that the new factor will reduce consumption considerably.

► Dollar metallurgy is getting a lot of attention in Detroit these days. While steel buyers are seldom able to do what they want to do, they have a very good idea about what they would like to do. When steel is more plentiful than it is now, those steels carrying too many size, alloy or processing extras will be dropped.

► Principal reason why electric furnace steel production has not been running even higher than it has is the shortage of electrodes. There is no reason to believe the electrode supply will be any better next year. But along with this the power shortage, rather than difficulty in lining up electrode supply, explains why steelmakers in some areas have not ordered the electric furnaces they would like to have.

► The construction industry should make greater use of fireproofed wood as a replacement for metal, according to the House Small Business Committee of Congress. This committee, headed by Representative Ploeser, R., Mo., is thinking about giving formal endorsement to Protexol, a recently patented fireproofing material for wood. Ploeser says that fireproofed wood can be substituted for metal in houses, office buildings, factories and ships.

► Mechanization of a gray iron foundry which produces small castings for electrical appliances has increased capacity from 40,000 to 60,000 lb per day and at the same time reduced the amount of material handled by its 75 employees from 1470 to 294 tons for the single shift. A ventilating system provides 8.4 complete changes of air per hr. Determining factor in approval of the modernization program was said to be improvement of working conditions to attract the right kind of labor.

► Nationalization of the British steel industry is well on its way. Only possible hope for its defeat is victory at the polls for the conservatives in the 1950 elections. But, even many of the conservatives believe that the labor party will be victorious again. They hope, however, the margin of victory will not be big enough to get the bill through its final stages. This is mostly wishful thinking though, because reliable sources point out that a party change at the forthcoming election is only a remote possibility.

HILLS OF

By RALPH VAILL
Consulting Engineer, New York

FIG. 1—Great layers and cliffs of the iron ore stretch for mile after mile.

In this, the first of three articles on the iron ore of Minas Gerais, Brazil, the author submits a possible answer to the iron ore dilemma, and warns that this ore is going to be important in the coming years, for there is enough of it to feed the iron and steel furnaces of the world for the next century. Located only 12 hr from the ocean, the ore of Minas Gerais is of a composition and quality unexcelled in the world, all of it higher grade than the ore that has built the iron and steel industry of the United States, the author claims. It is clean, reducible, free of moisture and can be mined and transported the year around.

OF HEMATITE

About the Author

Following is an excerpt fro ma news item appearing in O Globo, one of the principal newspapers in Rio de Janeiro, Mar. 11, 1948:

"Ralph Vaill, one of the great specialists of the world in steel, who during more than three years worked at Volta Redonda, left today for the United States of North America. He was chief of the unit for the production of steel since the time of construction of the Aciaria. In forming and training operations and skilled workers he instituted the necessary courses such as he had already done in Russia, where he was associated with the establishment of heavy industry beyond the Urals and left behind pupils who are today directing the two greatest plants established there. In Manchuria and Korea he was technical advisor for heavy industry."

THREE HUNDRED AND TWENTY-SIX years ago an emerald hunter, Fernão Dias Paes Leme, and his bedraggled company of bandierantes crossed over the Mantiqueira Mountains, deep in the heart of South America, and thus became the first white men ever to see the beautiful land of tumbled mountains that is now the most populous state of the Brazilian Federation.

Ten years later, Castanho Taques discovered gold and gave the name of Minas Gerais de Cataguás to the region, and throughout succeeding centuries this land of "General Mines" was the scene of stampede after stampede of gold and diamond hunters. Enormous riches went from here to an outside world. Those who came to wash river sands for gold and diamonds brought countless slaves.

They cut mule trails and wagon roads through the rugged terrain that they might bring to themselves from the coast, 220 mi away, the necessities of life. Hardly one of these roads or trails but which in the making uncovered great layers and cliffs and mountains of iron ore, as shown in fig. 1. Even today the outlying streets of the capital city of Minas Gerais, Belo Horizonte, are paved with iron ore rubble, and garden walls are built of blocks of the world's purest hematite.

The history of centuries of feverish clawing and pawing for gold and diamonds is hereabouts as fascinating and fantastic as that of the Amur, the Yukon, California or the Rand. From it all, probably a billion dollars of riches, more or less, were realized, and ironically more than 100 billion dollars of real wealth. The iron ores were left, untouched and unnoticed, until about the year 1800, 80 years after diamonds were discovered here, when some few men began to manifest a curiosity concerning the red rocks of Minas.

These red rocks in the Hills of Hematite of Minas are going to be important in the coming years, for there are enough of them to burden all of the iron and steel furnaces of the world for the coming century.

They are of a composition and purity unexcelled in our world. Some of them are only 12 hr from the ocean, and for the next 50 years can be gained from the earth of Minas Gerais with an ease that is fantastic. Fig. 2 shows the ease with which many of the deposits can be worked.

Even though many pathways have been cut to the once inaccessible place where this iron ore exists, no real path to the ore itself exists. A pathway to this ore will not necessarily be a completely physical thing; it will be a broad highway of commerce founded on understanding between nations, new formulas for exploitation and exchange, joint ventures of great mutuality in organizing vast shipping facilities that will involve harbors, railways, docks, freighters, etc.

Until we of the United States of North America and they of the United States of Brazil know

FIG. 2 — The ore, reported to be enough to supply the world's furnaces for the next century, can be mined with ease.

each other better, the making of the road to Brazilian ore will progress but little. The last war has been fought, as Professor Barmason has said, "on the Mesabi Range." The iron ore of Minas, therefore, becomes to us nearly as important as the oil of Arabia.

For 120 years men clawed and pawed at the rocks in the mountains and at the sand in river beds before the first "reasoner of the known to the unknown" in Minas Gerais began to speculate about all those iron ores lying so carelessly about. The Andrada brothers in their mineralogical accounts of journeyings northward from Sao Paulo to Minas were the first geologists to speak of the iron ore. Then about 10 years later a Dr. Jose de Sa Bettencourt Camara wrote, from deep in the heart of Minas, concerning the sands, clays, schists and quartzites of the iron rocks of the Piedade Mountains.

Between the years 1810 and 1830, while Brazil was throwing off the yoke of Portugal and becoming an Empire, the Baron Wilhelm Von Eschwegge and a metallurgist, Frederick Varnhagen, explored the geology of all the then accessible parts of Brazil, giving to the world their famous publication, "Obra Brazilienses"—the first great work on the geology of Brazil. In ensuing years others continued to develop a connected story of the rocks, plants, fossils, etc., all over the empire. Because of its importance mineralogically, Minas Gerais was well fixed in the general pattern.

Then in 1869 the Jean Louiz Agassiz Expedition went to Brazil to study especially the Amazon Basin for evidence of glacial effect. In addition to its contribution to the sum of known geology, this group left behind a notable personality, Charles Frederick Hart, who until his untimely death 11 years later from yellow fever did prodigious work, to bridge the great chasm separating belief from certainty in the minds of Brazilian scientists.

Hart's "Geology and Physical Geography of Brazil" is read today as though it were a current book. Orville A. Derby came here with the Edwin Morgan Expedition in 1870 and as student, teacher, collaborator, and inspirer remained until his death in 1915. His influence was profound. His end was tragic. His was the story of difficulty and frustration and all the disappointments that little men in government place in the way of advance.

In 1876 a great step forward was taken when the first school of mines, "Escola de Minas de Ouro Preto," was founded. A great Frenchman, Henry Gorcieux, was its first director. He was the man who made the men who completed the road to the mountains of the ore of Minas. Paul Ferrand, Joaquim Candido de Costa Sena, Louiz Felippe Gonzaga de Campos, Francisco de Paulo Oliveira, Joao Pandiá Calógeras, Miguel Ribeiro Arrojado Lisboa, Jose Pires do Rio, Louis Caetaro Ferraz, Euzebio Paulo de Oliveira, were some of the men trained there in the sciences of geology, mineralogy and mining who for 50 years have hewed away at the obstacles to the knowledge of how, why and where of the mountains and their contents.

The first really authoritative map of the iron ore occurrences in Minas Gerais was the work of Gonzaga de Campos. Jose Pires do Rio was one of the first boosters of the Valley Rio Doce. Arrojado Lisboa and Euzebio Paulo de Oliveira were coherent and prolific gatherers and disseminators of mineral and geological data and statistics. Presidente Rodrigo Alves created the "Servico Geologico e Mineralogico do Brazil" in 1907 with Orville Derby as director. This came to be really a school of geology on a grand scale.

In 1933 the Minister of Agriculture, Juarez Tavora, a real organizer, enlarged the scope of the Servico and made it into the Department of National Mineral Production, a move that really geared the work of the men of science to the national economy. Djalma Guimaraes, Euzebio

de Oliveira, Fleury da Rocha, and others have gained fame for their labors as members or directors of this very important branch of government.

These men, in this comparatively new department, and their coworkers have worked hard and published much. No doubt this is one of the reasons there are probably fewer foreign mining engineers and geologists in Brazil than in other South American countries. Those of note, in recent years from other lands were Professors Leith, Harder and Chamberlain, who came before and remained some of the time of World War I, and the German scientist Von Freyberg. These men contributed a fresh viewpoint, frequently challenging assumptions that had been more or less tacitly agreed upon, and offering new ones.

Then the search for strategic materials sent many men of fine capacity and ability to Brazil during the years of the World War II. They have materially helped to increase the knowledge that existed and to push back the boundaries of the unknown. However, they have not entirely explained to themselves nor to others the final reasons why billions of tons of a pure iron stone grew in Minas.

All agree about the time and general extent of the sedimentation. They agree as to the probable composition of the enormous deltas in the Algonkian Lake. As to what, when and how of what happened between then and the day these rocks and cliffs were first on top of the soil they do not accord so well. Professor Harder wrote in 1915, "The question as to whether the iron ores of Minas Gerais are the result of original deposition or of surface concentration is of great practical importance." He adds that the bedded iron ores occur in the headwaters of the Rio Piracicaba, Rio Carmo, Rio das Velhas, Rio Santo Antonio and Rio Paracopeba, the region in which the Itabira iron formation survives the denudation which has swept away much of the post-Archian formation of Brazil, leaving barren areas in between.

Another general point of agreement seems to be that these perfect iron ores are beds and lenses. Prof. Harder classified the original and bedded ores as they now exist as (a) hard massive ores, (b) soft powdery ores and (c) laminated or thinly bedded ores. The hard massive ore is a dense and a finely specular hematite and contains no more than 1 pct silica and an extremely uniform iron content. Sometimes the outcroppings of these deposits of massive ore are of enormous thickness. The ore cliff at Cauê, near Itabira de Mato Dentro, now the Getulio Vargas mine of the Valley Rio Doce project, in which the United States has an import-export bank interest, is 360 ft thick, 3200 ft long, and doesn't pinch out below, so far as anyone knows. Another, the great beautiful Pico de Itabirito, 10 or 15 miles away, is equally gigantic, with one great face 650 ft high of pure hematite and the other of a shining white quartzite.

Also there is powdery ore, "Jacutinga," existing in enormous tonnages. It is an ore of extreme fineness, going through a 100 mesh, very dry, very crystalline, and of good analysis. Then overall—and to extent not even estimated—lies the "Canga," a blanket of weathered ore fragments cemented in a matrix of limonite. And probably greatest in mass are the laminated and thinly bedded ores generally near the massive ore, called itabirites, with their spotty analysis. They are the characteristic ore of this great geological formation called the "Serie Minas." The massive ore bed and the itabirite beds have the same strike and dip and are perfectly comformable, a fact which should indicate that when the earth of Minas Gerais began to heave and toss and thrust itself above its lake, the massive hematite and the itabirite already existed in some form not too different from that in which we find them today.

The amount of each type of iron existing on and under the fabulous soil of that part of Minas Gerais geologically known as the Series Minas is anybody's guess. At present, Prof. D. Van Nostrand Dorr and a group working for the Joint United States and Brazilian Geological Commission are surveying these iron deposits as to location and extent. This is the first scientific attempt at evaluation.

As a layman in mining and mineralogy, it has

FIG. 3—Newly completed cut for the single track line to the Itabira ore fields.

been interesting to the author to watch the Russians, Japanese and Brazilians in turn evaluate their deposits. The Soviet prospector must report an astounding discovery. Hence he knocks off a chunk of the best looking rock, triangulates the deposit, plays some sort of numbers racket as to probable depth, and next day publishes the result in Za Industrializatsu. The Japanese, hungry for anything that would yield iron, takes sample after sample, measures carefully the amount above ground, and burrows underground in every known way to find where his deposit pinches out. The Brazilian takes a bored look at his mountain of chemically pure hematite, looks across the valley at one just as pure and just as large and again begins pondering how he can sell a few tons.

As to the value of an ore property in Minas, even if the existing tonnage were known, it is interesting to read the prospectus for a hydroelectric dam that is to be constructed at Fecha Funil on the River Paracopeba near Belo Horizonte. The anchorage of this dam will be in a vein or seam of high grade massive hematite 590 ft in thickness, this vein being the backbone of the mountains which narrow the river at this point.

Under the waters of the lake that will be formed will be 30,000 acres of earth with the Lord knowing how many millions of tons of iron ore once again forever under water. Not one penny is listed as representing the value of this ore. This is certainly quite a contrast to the great work at Steep Rock where a lake was drained and its waters diverted so that the ore on the bed of the lake could be gained to help tired old Mesabi carry its load.

In 1943, Djalma Guimarães and Octavio Barbosa made an authoritative map of the Geology of Minas Gerais. The boundaries of the Series Minas are clearly and definitely drawn on that map, and no matter where you explore within those boundaries you will find iron ore. For example, to the west of the Belo Horizonte, striking east to west they showed the Serra do Itatiaussu as being iron bearing. Very little work had been done at that time to prove important occurrence.

Since then, fabulous deposits have been definitely determined as existent and in easily won condition in this range. We in the north know mostly about the iron ores at the headwaters of the Rio Doce, for we are partners of Brazil in the development of the Port of Vitoria, the rebuilding of the Valley Dio Doce Railway, and the opening of the Getulio Vargas Mine. We know the three great peaks of pure hematite, Caue, Caete and Esmeril, that will some day send more than a billion tons to an outside world. But from there on, west and south, we do not know so much about the Pico Itabirito, the great Hogback of Casa de Pedre, the Serra Moeda, the Serra Coral and the great cliffs of iron ore practically overlooking the city of Belo Horizonte.

All of the ore in these mountains and hills is higher grade than the ore that has built the iron and steel industry of the United States of North America. Normal characteristics are shown in table I. It is clean, it is reducible, it is free of moisture and it is chemically far purer than most ores. It can be mined and transported the year around in a climate as nearly ideal as can be found. For steelmaking, since it contains no tin, lead, copper, chrome, nickel or dirt, it is a dream.

The building of the inevitable pathway to the mountains of Minas will probably have been accelerated rather than delayed because of the various international foolishness of the past 25 years. War demands stimulated the work begun by the remarkable Percival Farquhar of England, Russia, Africa, Cuba, Brazil and other places, who more than 25 years ago began dreaming of moving the mountains of Minas. It is a far cry from a Siberian gold field on the frozen Lena River to the mountains of iron ore in the semitropical forests of Brazil. To men like Farquhar, time, season and space are only trivial obstacles.

Today Farquhar is the spark plug of the organization that is building a steel plant on the Rio Piracicaba in the shadow of his mountain, and three nations of the world are engaged in building the Farquhar pathway from Vitoria on the sea, up the Rio Doce to these mountains. And herein reposes another of the beautiful little ironies so frequently popping into the development of the Minas picture.

In his book, "Notes About Iron Works," Jose Gerspacher, a famous designer, builder and operator of many of the small charcoal furnaces that exist in Brazil, mentions that at Itabira do Campo, 60 miles or so to the southwest of the Farquhar mountains, a company was formed in 1892 to build a little charcoal iron furnace called

TABLE I

Brazilian Ores of Primary Formation

DESIGNATION	NORMAL CHARACTERISTICS					
	Fe, pct	Mn, pct	P, pct	S, pct	SiO_2, pct	Al_2O_3, pct
Compact or Massive Hematites[1]	66.0 to 70.0	0.01 to 0.10	0.01 to 0.08	0.01 to 0.03	0.10 to 1.50	0.05 to 0.50
Compact or Massive Itabirites[2]	60.0 to 66.0	0.10 to 0.50	0.03 to 0.06	0.01 to 0.03	0.30 to 5.00	0.10 to 0.50

[1] Within the composition limits are ores suitable for bessemer, openhearth and blast furnace usage.
[2] Especially suitable for blast furnace usage.
In addition there are wide deposits of friable itabirites and jacutingas; however, deficiency of mechanical resistance makes these ores unsuitable for openhearths and blast furnaces.

FIG. 4—Ore being loaded at one of the Itabira field's depots.

the Usina Esperanca. He writes, "The iron ore was brought to the plant by a Decauville line of 30 in. gage, in wagons of 1½-ton capacity, pulled by animals. The ore was taken from near an old gold mine, of Cata Branca, on land sold to the plant by the Imperial Government. The area comprised 1800 acres and sold for one 'mil-reis' an hectare. This land included the Pico Itabirito now estimated to contain 200 million tons of the world's purest iron ore."

Today 700 mil reis is about $35. This can hardly be called inflation. Rather, it is as though they had advance information that the 1893 panic was around the corner. As a contrast, the Valley Rio Doce project to improve the harbor of Vitoria, revamp and equip 250 miles of 36-in. gage railway, and equip the Pres. Vargas Mine (all of this being Farquhar's dream) has cost Brazil nearly $100 million and is not yet completed. For this money the world cuts a pathway to three great mountains of ore—Esmeril, Caue and Caete.

The pressure of the unused wealth of Minas has long been a factor in shaping the politics and economic development of Brazil. As a result, at least four railroads have penetrated the boundaries of the state. The Leopoldina railroad to to tap the gold, sugar, coffee and pastural sections of the southeast. The Central do Brazil to connect Rio and the capital of Minas, Belo Horizonte. The Rede Mineira, a state railroad of Minas Gerais, leads down from the central section toward Sao Paulo. And as already mentioned, there is the Estrada do Ferro Vitoria, now a part of the Valley Rio Doce Project coming in from east to west. Fig. 3 shows a cut of the line recently completed to the mines at Itabira, and fig. 4 shows the loading at one of the stations.

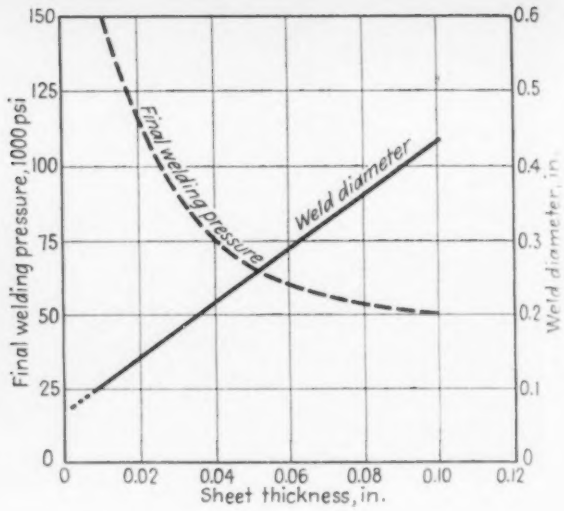
To give an idea of the capabilities of these roads as freight movers, consider the newest, that of the Valley Rio Doce project. It has 31 steam locomotives, two diesel-electrics, 350 50-ton ore cars and 425 general freight cars. The most important line, the Central do Brazil, connects Rio de Janeiro to both Minas Gerais and Sao Paulo. It has, all told, 2300 miles of line of which 870 are broad gage. Soon 375 miles will be electrified. It has 693 steam locomotives, 39 diesel-electric, and 6 electric. It has 8400 freight wagons of various types and capacities. To get over the Serra do Mar, the coastal escarpment that blocks off Brazil's hinterland from its coast, the Central broad gage line has grades often over 2 pct. It cannot consistently now handle more than 1000 tons of revenue freight in a single train.

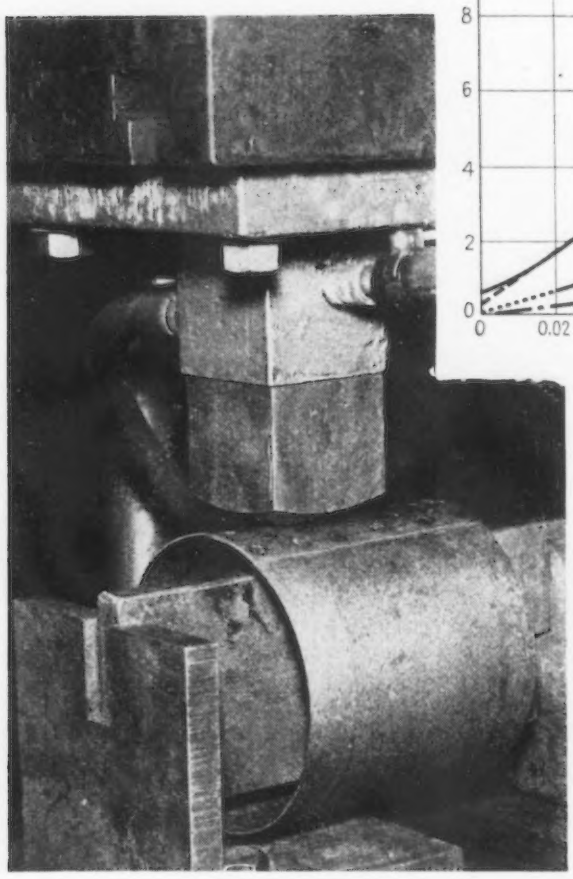
The Valley Rio Doce Line, newly revamped, can, though only meter gage, handle 1500 tons. The Rede Mineira, in dropping down to sea through its newly won corridor will for a long time, probably, content itself with very small trains of eight or ten 30-ton cars. The pathfinding is, therefore, about done — now comes the task of using and improving.

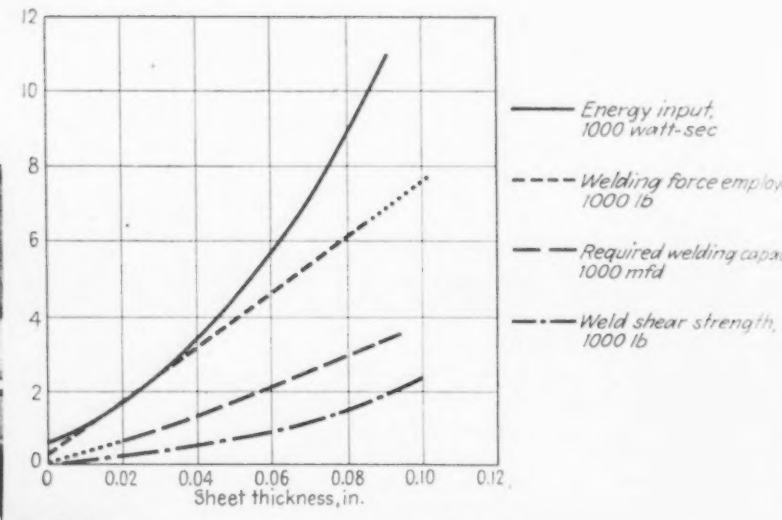
In subsequent issues the author will discuss the Brazilian politico-economic situation and its effect on the development of the Minas Gerais ore fields, and will consider the cost factors involved in mining and shipping the ore to this country.—Ed.

BELOW

FIG. 1—This furnace muffle of 0.050 in. thick molybdenum was welded with a tungsten electrode shielded with argon.







ABOVE

FIG. 2—Spotwelding 0.062 in. molybdenum. The welds show electrode pickup.

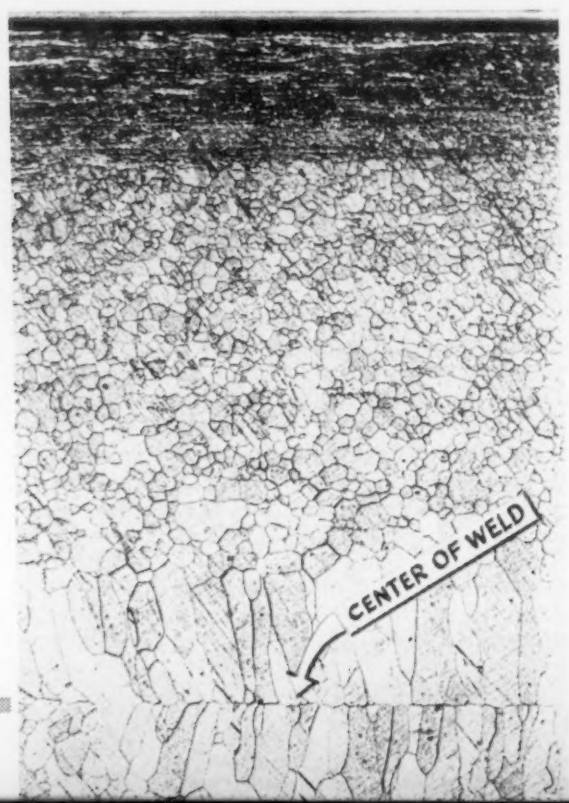
ABOVE

FIG. 3—Conditions used for and results obtained from spotwelding molybdenum. A—Weld diameter and final welding pressure. B—Energy input; welding force; required welding capacity; and weld shear strength.

o o o

RIGHT

FIG. 4—Microstructure of spot weld in 0.050 in. molybdenum.



Welding High Purity Molybdenum

By JULIUS HEUSCHKEL
Westinghouse Research Laboratories, East Pittsburgh

In conjunction with research on the methods of machining molybdenum, described in THE IRON AGE, Dec. 9, p. 106, welding methods were also investigated. Inert gas shielded arcwelding and spotwelding are being regularly used for joining molybdenum to molybdenum and molybdenum to other metals. Flash and percussion welding experiments are discussed.

WHEN contemplating the use of molybdenum as a component part of a structure or piece of equipment one is immediately faced with a joining problem. Molybdenum is being welded by the spot, seam, percussion, flash and inert gas-arc processes, but whether or not molybdenum can be welded in production requires careful qualification.

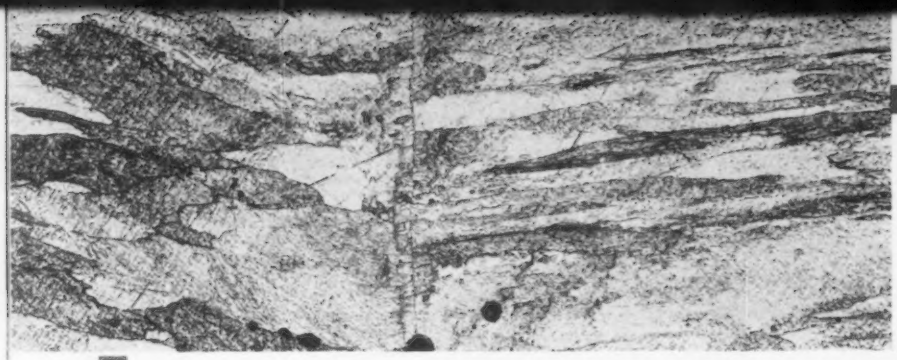
The problems of welding molybdenum are related to basic properties of the metal, namely, its high melting point, high strength, susceptibility to oxidization and the normal temperature brittleness of the large grained recrystallized metal. The first two characteristics increase the difficulty of maintaining the shape of resistance welding electrodes without pickup, the third places high efficiency requirements on shielding against the surrounding atmosphere and the fourth places severe restrictions upon design and service applications. Recrystallized molybdenum including weld metal is inherently brittle at room temperatures. This absence of ductility tends to disappear at or above 200°F.

In spite of these problems the welded material has its applications. For example, welded molybdenum furnace muffles, gas tight at high temperatures, are in service. The design of one of these muffles, made of 0.050 in. thick molybdenum with a 6 x 6 in. cross section 18 in. long is shown in fig. 1. The locations of the edge and corner welds used are apparent from the photograph. Muffles 0.020 in. thick have also been made using overlapping spot welded construction.

The inert gas-arc process, wherein the heating agent is an arc between a tungsten electrode and the work within an argon or helium shield, was used to fuse the edges of the muffle joints in fig 1. Ac with 100 amp and a 3/32 in. diam tungsten electrode in an argon shield were used throughout with filler metal being added only in the corners at the back where a poor fitup required additional metal. Longitudinal weld cracks sometimes occur when making butt joints, but with the more flexible edge and corner joints no cracking was observed. Some pinhole porosity occurred during the initial pass of the arc. This was eliminated by remelting the weld metal by a second passage of the arc along the entire weld length. Within the qualifying experiences described this process has given satisfactory results.

Spot welding, using either ac or dc, has been employed for the satisfactory production of molybdenum parts for high temperature gas tight applications. Such a part is shown in fig. 2. The major problems in spotwelding are: 1—Electrode contamination of the external sheet surfaces, 2—pickup of the external surface on the electrode, and 3—deformation of the electrodes under the imposed high pressure-temperature combinations. All result in rapid deterioration of the electrode face, and unsightly, low strength welds.

The problems are not as serious on the thicker sheets where the electrode face is somewhat further removed from the edge of the molten area and when lower pressures are permissible.



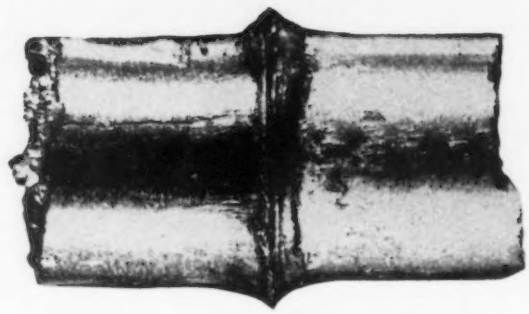
B

FIG. 5—External appearance (A) and microstructure (B) at 100X of percussion weld in 0.25 in. diam molybdenum.

Condenser discharge dc welding data, including properties obtained, are shown in fig 3.

Where gas tight seams are desired, as in fig. 2, a row of tangent or overlapping spots are used. This row of welds is made near one joint edge so that lower direct tension components will be placed on the welds. The auxiliary spot welds are then used as shown to assure that it is not possible for high bending loads to be placed on the edge seam weld. This is an important consideration with molybdenum because the welds have almost no ductility at room temperature. This illustrates how joint design can be employed to compensate for deficiencies in welded material properties.

Best results are obtained with the contacting interfaces grit blasted to form a multitude of minute projections. When welding in air, the electrode life is short. Sometimes it is possible to make only three or four welds between subsequent dressings of the electrodes. The parts are therefore commonly welded under water to reduce the tendency towards surface overheating, electrode pickup and electrode deformation. Welding times as short as ½ cycle are also used to increase electrode life. Typical coarsened structure in the welds made by this process is shown in fig. 4.



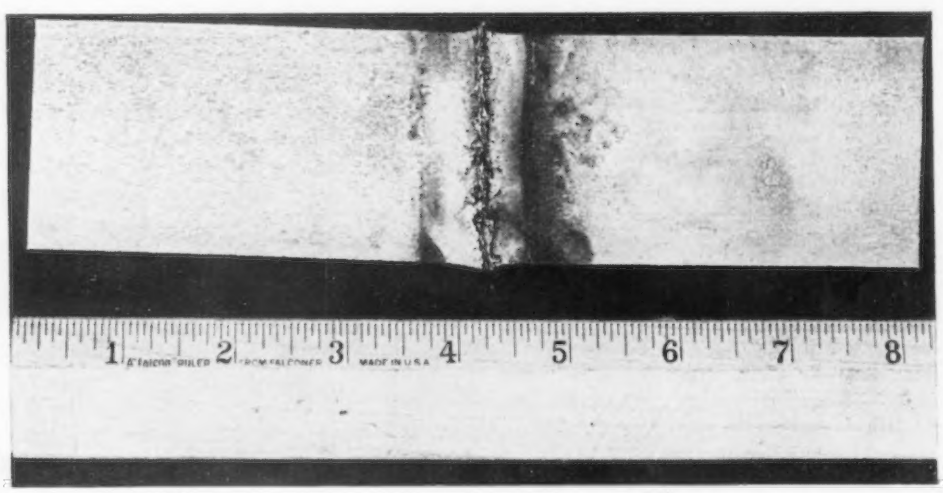
A

Small diameter wires of this metal are commonly joined by spotwelding.

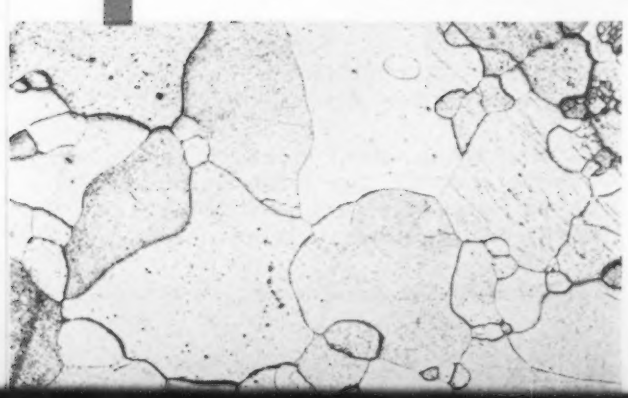
Spotwelding is sometimes done by inserting a thin strip of nickel between the molybdenum sheets. While this procedure eases the joining problem the resultant product may be limited in temperature applications to that which can be withstood by the nickel insert.

Percussion welding, wherein the heat is developed by the short time passage of an electrical charge across the welded interfaces simultaneously with the dynamic application of force, has been experimentally employed for the welding of molybdenum rods up to 0.25 in. diam. A half diameter view of a completed joint and

FIG. 6 — External appearance (A) and microstructure (B) at 100X of flash weld in 0.085 in. molybdenum.



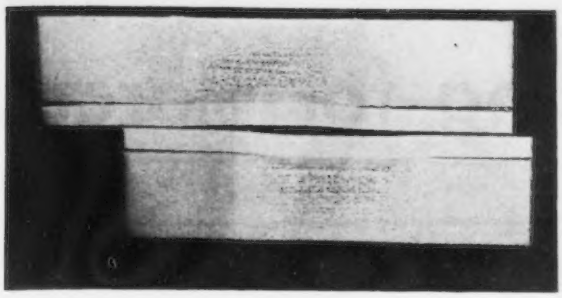
A



B

of the resulting microstructure at the longitudinal section of the weld are shown in fig. 5. This process is little used commercially, but it results in a very thin microstructurally disturbed zone.

Molybdenum cannot be flash welded directly in air because of the tendency of molybdenum



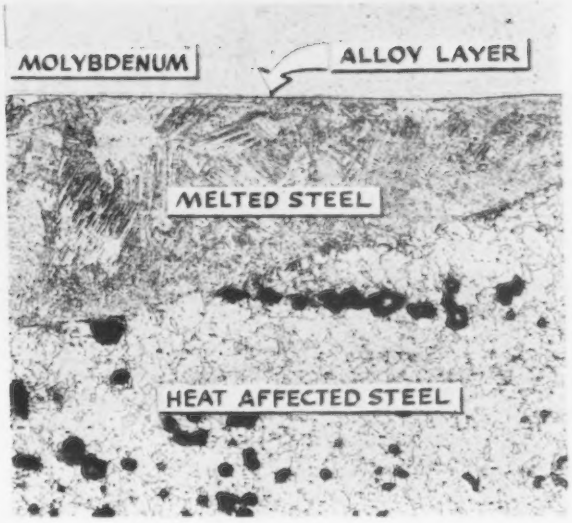
ABOVE

FIG. 7—Molybdenum can be welded to materials with which it will alloy, as shown by this weld of molybdenum to carbon steel. 5X.

o o o

RIGHT

FIG. 8—In this microstructure (100 X) of a spot weld between molybdenum and low carbon steel, carbon-poor nodular pearlite was darkened to such a point that these lamellar formations show as black areas.

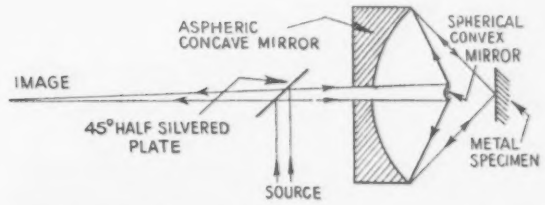


to oxidize. The result of this tendency when attempting to flash weld two parts together is a roomful of molybdenum oxide streamers but no weld. However, strong but brittle flash welds have been made in a shielding atmosphere employing a reducing gas such as hydrogen. A laboratory made weld under these conditions is shown in fig. 6. A very coarse grain structure is obtained.

Molybdenum can be welded to other metals with which it readily forms an alloy. Spot welds made between molybdenum and low carbon steel are shown in fig. 7. In such an unusual combination, fusion is obtained only for the lower temperature melting point metal. A very thin alloy layer is formed at the interfaces and, for the 0.029 in. molybdenum to 0.115 in. thick steel sample shown, an average strength in shear of 1600 lb per weld was obtained. Such welds have little strength in bending or direct tension.

In resolving the other more delicate structures in the molybdenum-to-steel spot weld, the carbon-poor nodular pearlite in the heat affected zone of the steel was darkened to such a point that these lamellar formations are shown in fig. 8 as black areas. The presence of the nodules, which result from the rapid heating and quenching incidental to the spotwelding process, is related to the initial presence of smaller pearlite volumes in the as-furnished steel.

Metallographic Examination of Hot Metal Surfaces



Optical system for examination of metallurgical specimens, using mirrors instead of lenses.

THE microscopic examination of surfaces of metals such as nickel, steel and molybdenum at temperatures up to bright red heat has been made possible by the application of the reflecting microscope. This instrument, described in the *Iron and Coal Trades Review*, June 18, 1948, is somewhat unusual in that the essential optical components comprising the objective are mirrors and not the conventional lenses. The optical system as set up for the examination of metallurgical specimens is illustrated in the accompanying sketch.

A feature of the instrument is its freedom from chromatic aberration. This is due to the common optical property of no dispersion with reflection; thus the instrument can be used for photography in the ultraviolet spectrum (increasing the resolving power and observing selective absorption) after having previously focussed the instrument in visible light. Another advantage is the long working distance—about 1.5 cm (0.59 in.) for 0.7 N.A.—the depth of focus is the same as for an equal numerical aperture refracting microscope.

Welding for Porcelain

By L. K. STRINGHAM
Engineer in Charge of Welding Applications, Lincoln Electric Co., Cleveland

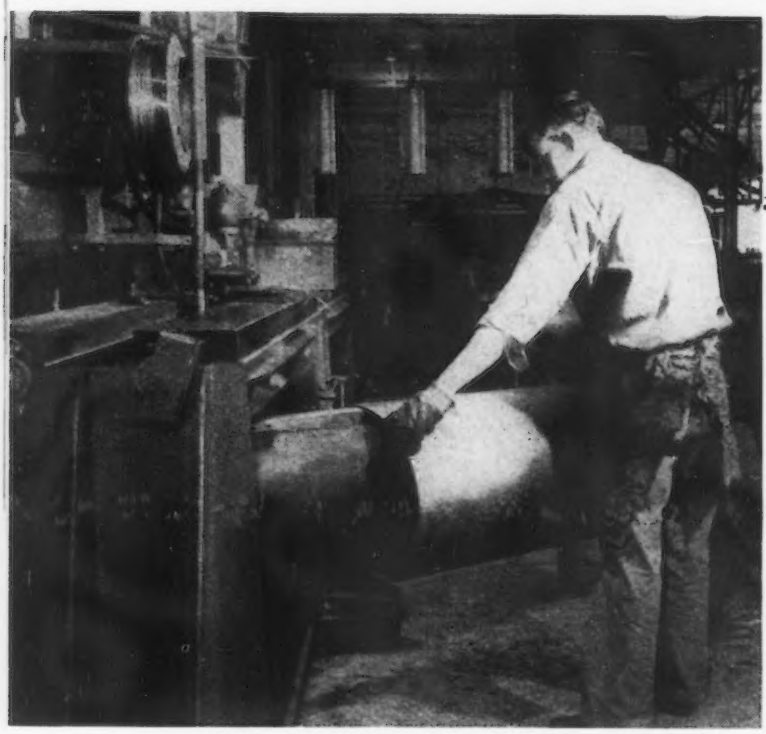


FIG. 1—This automatic setup for submerged melt welding hot water tanks shows the operator slipping a formed part on the horn type fixture prior to welding the longitudinal seam.

ARCWELDING is being increasingly used by manufacturers of porcelain enameled products to improve quality and reduce costs. Wartime developments in welding equipment and electrodes answered the main problem of arcwelding for porcelain enameling, namely, making a weld free of any contamination that will gas during firing and cause the enamel to strip off.

For many years porcelain enamelers have sought to take advantage of arcwelding, using all known types of shielded arc electrodes, only to meet with the disappointment of stripped coatings as their products cooled. This difficulty was attributed to porosity, stresses in the welds, steel analysis and other causes. When this occurred it was necessary to sand blast off the defective finish, re-spray and re-fire the product. This procedure established the idea that to take advantage of welding, it was necessary to anneal and stress relieve before firing.

Investigations have revealed the cause of this stripping difficulty. By making welds with ordinary electrodes, quickly sand blasting and submerging them in glycerine, it was discovered that a large number of bubbles collected on the weld while a smaller number of bubbles collected on the steel. It was deduced that these bubbles were hydrogen and had come out of the weld in tremendous quantities relative to the amount that came out of the steel itself.

Organic material and moisture, normally present in ordinary electrode coatings, produce hydrogen when burned in the arc. Molten steel has a great capacity for absorbing hydrogen, and as the weld metal solidifies, hydrogen evolves from the metal. The weld continues to expel it after it is solidified and is cold.

The behavior of hydrogen in steel is critical in porcelain enameling. During welding, hydrogen is trapped in the weld. Although the weld cools and solidifies and hydrogen starts to come out, the evolution is slow and much of the hydrogen is still in the weld when the product is fired. Firing releases the hydrogen, which comes out of the steel and loosens the glass coating.

The development of the lime-ferritic shielded arc electrodes for regular open arcwelding and the development of the submerged melt welding process for automatic welding helped solve the problem in welding porcelain enameling stock. The working out of techniques with these developments is extending the use of arcwelding into the manufacture of such items as range boilers, bath tubs, sinks and other types of porcelain enameled products. Arcwelding is practical in a

elain Enameling

The need for annealing and stress relieving weldments prior to firing porcelain enameled products has been eliminated through the use of two wartime welding refinements, the inorganic lime-ferritic electrode for open arc-welding and submerged melt welding. Bubbles in enamel after firing, caused by hydrogen absorption from organic matter and moisture in electrodes, can be eliminated through the proper use of these welding media. Procedure, design, material, preparation and welding methods are described.

wide range of steel quality and in thicknesses from several inches down to 20 gage.

The lime-ferritic electrodes were developed during the war to weld armor plate. Stainless electrodes were being used for welding armor, but it became necessary to conserve stainless. Needed was a low alloy, ferritic electrode. The lime-ferritic, low hydrogen electrode was developed and has been improved since its introduction. The desired operating characteristics have been achieved by producing a coating free of organic materials and baked at high temperatures to eliminate moisture. Welds deposited by these electrodes are low in hydrogen. These are the electrodes now being used successfully by porcelain enameling plants to make welds that do not require annealing before firing.

The hidden arc process was the result of efforts to provide a way of shielding the arc while automatically feeding a bare electrode wire. The development has made it possible to deposit highly uniform welds at greater speeds than can be achieved by regular hand welding. The welds are low in hydrogen, dense and ductile, and can be enameled without annealing.

For the enameler, in addition to eliminating the costly necessity for annealing before firing, it makes possible welding speeds as high as 120 ipm. These welds require little or no grinding to give a finished surface, and the uniformity of the welds reduces repairs and rejects to a minimum. The process is also free of spatter and visible arc rays.

While these developments are opening new possibilities for the use of arcwelding in making products that are porcelain enameled, following are the welding techniques and procedures that should be applied for satisfactory results.

Material: Enameling stock is low in metalloids and carbon, and is generally clean and free of rust or scale. The material normally used, therefore, is readily weldable. Care should be taken, however, to see that joint edges are clean of all foreign matter such as moisture, rust, dirt, oil, grease and paint primer. It is important

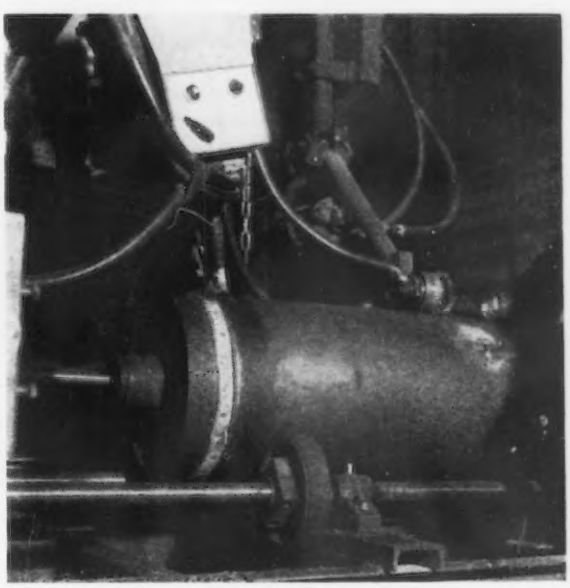


FIG. 2—After welding the longitudinal seam, as shown in fig. 1, the flue is welded to the top of the tank in 12 sec; and in this fixture the head of the tank is welded to the shell.

TABLE I

Plate Thickness (T), Gage	Welding Current		Welding Speed, Ipm	Electrode Wire Size, In.
	Amp	Volts		
14	400	24	100-120	1/8
12	500	30	100-120	1/8
10	650	31	80-100	1/8

that the butting edges themselves be clean, as simply cleaning the top of the plates will not help much. If welds are to be successfully por-

TABLE II

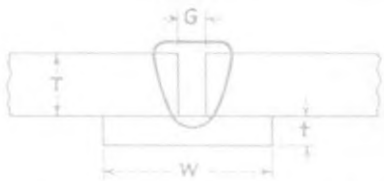


Plate Thick-ness (T)	Welding Current		Welding Speed, Ipm	Elec-trode Wire Size, In.	G In.	t, (Min)	W, (Min), In.
	Amp	Volts					
18 Ga.	450	25	100-120	1/8	1/32	14 Ga.	3/8
14 Ga.	500	27	70- 90	1/8	1/32	12 Ga.	3/8
12 Ga.	550	27	60	1/8	1/16	12 Ga.	1/2
10 Ga.	650	28	48	5/32	1/16	1/8 In.	5/8
3/16 In.	850	32	36	7/32	1/16	3/16 In.	3/4
1/4 In.	900	33	26	7/32	1/8	1/4 In.	1
3/8 In.	950	33	24	7/32	1/8	1/4 In.	1
1/2 In.	1100	34	18	7/32	3/16	3/8 In.	1

celain enameled, all contamination that will gas during firing must be eliminated.

Design: The forming of sheet metal parts for welded assemblies should conform to the principles of fabrication for products to be porcelain enameled as outlined in a handbook "*Design and Fabrication of Metal Parts for Porcelain Enameling*," published by the Porcelain Enamel Institute, Washington.

TABLE III

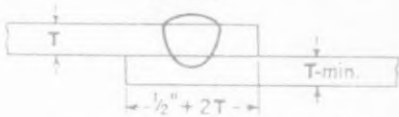


Plate Thickness (T), Gage	Welding Current		Welding Speed, Ipm	Electrode Wire Size, In.
	Amp	Volts		
18	450	23	120	1/8
16	500	26	120	1/8
14	550	28	120	1/8
12	650	30	100	5/32
10	750	32	80	5/32

Preparation and Fit-Up: For porcelain enameling, the fit-up of joints to be welded must be uniform. Variation in gap or unevenness in the joint can be the source of allowing the weld to blow through or to trap slag. Unevenness may also cause undercut in the weld, which can be troublesome to enamel and result in poor appearance. There will naturally be more concern over fit-up when a butt joint is made than when a lap joint is used. While the lap joint requires less care in edge preparation more metal is needed to make the lap.

Consideration for preparation and fit-up should begin with the design of the product. It may be found possible to place welds on the inside so that they do not show, in which case close limits, in so far as they affect appearance, need not be held. It may also be possible, where the weld is hidden, to eliminate grinding that would be necessary to give a perfectly flush appearance on the outside. Intermittent welds can sometimes be substituted for the continuous welds by hiding the weld so that appearance is not affected.

In planning for fit-up, good fixtures should be designed and used. They must be easy to work yet rigid and strong enough to hold the work in proper alignment during the welding. Fixtures will vary widely, depending on the nature of the work, from elaborate, complete production set-ups to simple clamps to hold the work for tacking. Some of the examples of various fixtures for hidden arcwelding are shown in Figs. 1 and 2.

Welding Procedures: Welding procedures for the many different combinations of conditions are numerous. Polarity, current voltage and travel speed will depend upon the joint design and product specifications. In general, the operating variables will be controlled to avoid excessive reinforcement. It should also be noted that if both sides of the product are to be enameled, all welds must have 100 pct penetration. They must weld all the way through to the opposite side of the piece. If the back side is not perfectly fused, trouble will result in enameling those spots where there are gaps.

Submerged Melt Welding: The nature of the work to be welded will determine whether to use the automatic or the manual hidden arc process. If the operation is repetitive in nature and is to be done in large lots on uniform pieces, an automatic installation is warranted. If lots are small and the size or contour of the welds to be made are irregular, the more maneuverable manual equipment is preferable.

In either case, the welding current should be dc. Dc is more suitable for hidden arcwelding in light gages. With ac welding current the current as well as electrodes speed are affected by the variations and surges in the input power supply, with the result that the ac installation does not give a uniform weld on light gages. Dc also provides a further advantage in that polarity can be controlled to meet varying joint design conditions.

It is important that the granular shielding flux be free of contamination that might be pick-

ed up through careless handling. Foreign matter, such as grease, water, mill scale and iron oxide, will result in both porosity and surface pin holes.

The commonly used joints in porcelain enameling work are plain, butt, lap and edge welds. The data in the accompanying tables give the welding procedure to be used in making these joints under normal conditions. From the welding speeds shown, it can be seen that welding with the automatic hidden arc, in addition to its other advantages, is many times faster than regular hand welding.

The procedure generally used to make the longitudinal seams of hot water tanks is to weld the plain butt joint against a copper backup strip that is part of the welding fixture. Welding conditions are given in table I, and complete penetration is obtained.

Table II represents a condition where the sheet is welded onto a steel backing, such as might occur in welding a flat table top to a channel or T section. It is possible to weld lighter gage materials with this procedure since the backing strip acts as additional thickness of the sheet so that burn-through is not encountered.

The type of lap weld shown in table III is sometimes called a through-weld, since the weld is not made at the joint but right through the top sheet fusing it to the lower one. This technique is useful either in joining two pieces of light gage material or in joining a light piece to a heavier one. While the table indicates its use on material no lighter than 18 gage, it is being successfully done joining two sheets of 20 gage material to make a heat exchanger shell.

Table IV gives data for making edge welds, important in sheet metal work.

All of these welds shown may be porcelain enameled without grinding if specifications do not call for elimination of all weld metal appearance in the final finish. They may also be enameled over without annealing before firing. Welds deposited manually by the hidden arc process will be of the same quality as those made automatically. Speeds and amperages used, however, will not be as high as those indicated for automatic welding. The equipment has the advantage of being flexible and can be used where it may be physically impossible as well as impractical to use the automatic unit.

TABLE IV

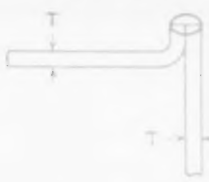


Plate Thickness (T), Gage	Welding Current		Welding Speed, Ipm	Electrode Wire Size, In.
	Amp	Volts		
16	350	20	160-180	3/32
14	375	23	100-120	3/32
12	450	24	100-120	1/8-3/32
10	600	30	80-100	5/32
3/16 In.	650	31	60- 80	5/32

Fig. 3 shows hidden arcwelding being used at Glascote Products Inc., Cleveland, to weld the inside of the head of a reactor that will be glass lined. The 1-in. head is being joined to the 15/16-in. shell by one weld pass on each side. Both the head and shell have a 30° bevel to a ¼-in. land, making a double V joint on each side. The joint is completely cleaned by grinding and the head is then tacked in place using a low hydrogen electrode, as shown in fig. 4. All places where daylight shows through in the fit-up are welded with a sealing bead. With manual hidden arcwelding, one bead is then put on each side obtaining 100 pct penetration. Approximately 500 amp are used at a speed of 10 ipm. When the second head is put on to close the tank, the welding gun is taken inside the tank to make the final weld, joining the head to the shell.

Manual Open Arcwelding: Manual open arcwelding with lime-ferritic electrodes, in general, is similar to welding with stainless steel electrodes. For the best operation and fastest welding speeds these electrodes should be used at the

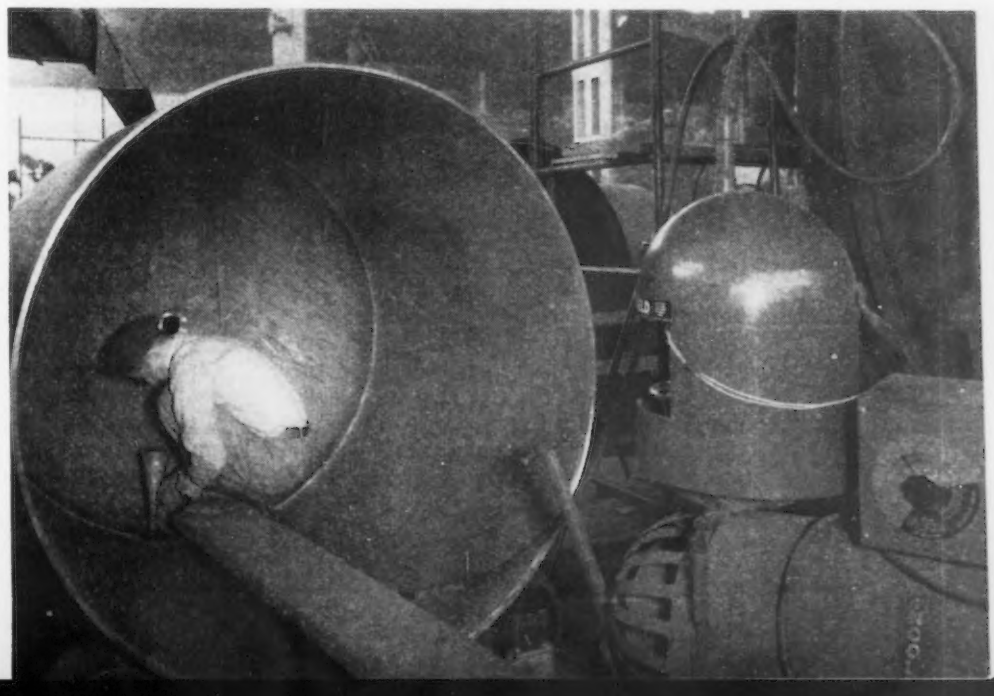


FIG. 3—A manual hidden arcwelding unit is being used here to weld the inside seam joining the head to the shell of a reactor to be porcelain enamel lined. The same welding unit is used to make the inside weld joining the second head to this closed tank, the operator and equipment entering through a porthole.

FIG. 4—The outside of the seam is welded, joining the head to the shell. One pass on each side gives complete penetration. The head is first tacked to the shell with a low hydrogen, lime-ferritic electrode by open arcwelding.

highest current that is consistent with plate thickness, fitup and type of material being welded. Too low a current will result in an unsteady arc with large droplets passing across the arc, tending to produce convex beads having little penetration.

On practically all applications the best results can be obtained by holding as short an arc as can be maintained without sticking. On many applications, the dragging technique can be used to good advantage. Holding too long an arc will tend to produce undercut and poor bead contour, especially when welding vertical or overhead.

On some applications, particularly those where relatively low current must be used, there will be a tendency to produce pin holes at the start of the bead if the arc is struck in the conventional manner. This can be overcome by the following methods (1)—Use as much current as is practical; (2)—strike the arc about 1½ in. ahead of the crater, move back into the crater and continue to weld over the spot where the arc was struck; (3) travel slowly for the first inch or two giving any holes a chance to be melted out, and, (4)—if arc blow is present, the tendency towards these holes will be greater. Corrective steps to overcome the arc blow may be necessary.

The same precautions as to avoiding foreign matter should be observed in using these electrodes as is done with automatic welding. Dirt on the work will cause porosity. If the electrode coating has picked up moisture, some porosity in the weld may occur. This can be remedied by drying out electrodes for 1 hr at 350°F.

The lime-ferritic electrodes should be used not only for welding articles to be enameled, but should also be used to tack weld prior to automatic welding for enameling.

Effect of Particle Size in Powder Metal Parts

REMOVAL of the coarse fractions, —100 +150 mesh, from iron powders and increases in compacting pressure have been found to improve substantially the tensile strength of pressed and sintered compacts, according to a report prepared by Stevens Institute of Technology which carried out an intensive research program under a grant from the Office of Technical Services, Department of Commerce.

The study showed particle size to exert considerable influence on many of the properties of both iron powders and their compacts. Specific relationships were verified between the apparent density of a powder and its compressibility ratio, the relative flow of a powder and its dimensional change in sintering, and the weight loss of a powder in hydrogen.

Recommendations are included in the report for the improvement of commercial specifications applicable to iron powders. It is emphasized, however, that particle size is but one of the characteristics determining properties of metal powders and that others, such as particle shape, hardness and density, may be of even greater importance. Further research is recommended to clarify the role of these other factors.

Since the completion of the project, Stevens Institute has received a grant for the development of iron powder rotating bands from the Watertown Arsenal Laboratory of the Army Ordnance Department.

The report, designated PB 95054, is available from the O. T. S., Dept of Commerce, Washington, at $3.00 per copy.

Truing Form Grinding Wheels

By Jack T. Welch
Sales Manager, Machine Tool Div., Sheffield Corp., Dayton

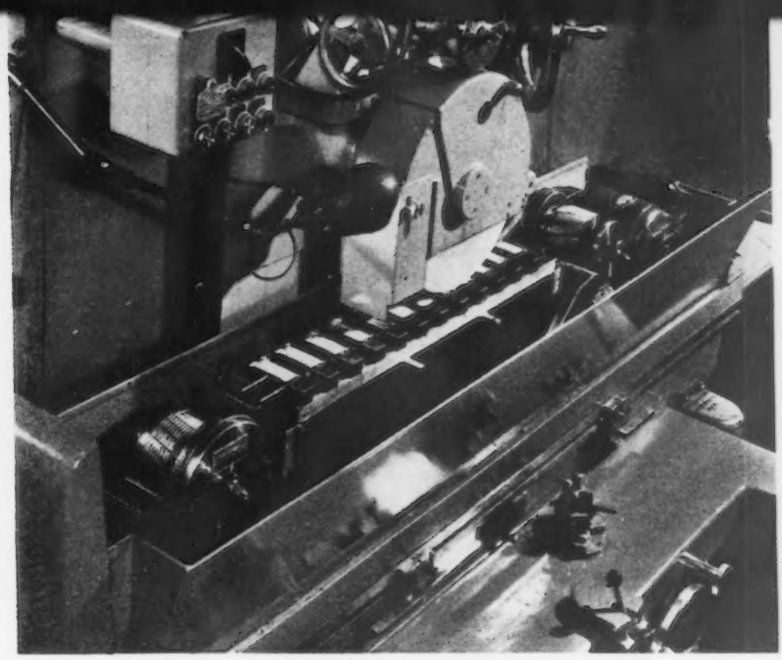


FIG. 1—The master and work roll principle of Crushtrue forming is shown forming this 220 grit 3 in. wide vitrified wheel for grinding 12 pinking shear blades simultaneously on a surface grinder. Crush dressing time is 1 min.

The high speed, accuracy and ease with which wheels used in crush form grinding are trued with high speed steel and cast iron crushing rolls has permitted wider application of this machining method. The use of these wheel truing rolls, their accuracy, construction and sizing are explained by the author.

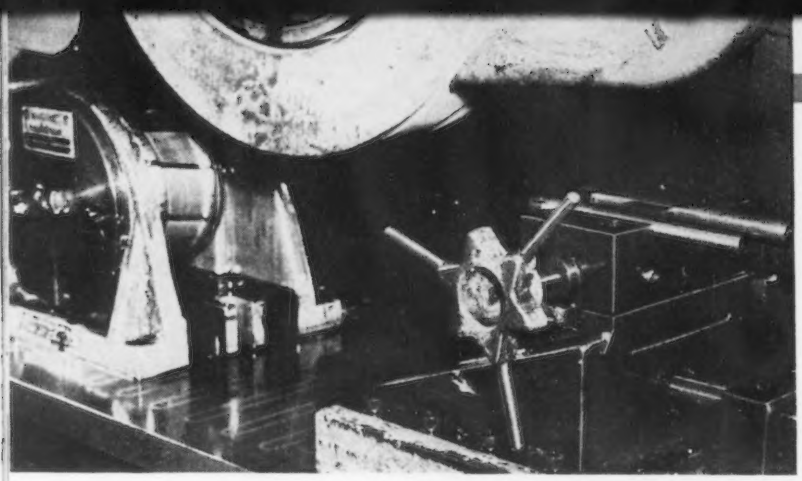
THE application of crush forming abrasive wheels has undergone many changes since its commercial use on a widespread scale was introduced in the United States a few years ago. These changes have resulted in better methods of application; reducing and, in many cases, eliminating the slotting of rolls; widening the range of usable wheels; and giving the manufacturing engineer another possible solution to grinding problems involving either circular or flat forms.

With this process the entire profile on several parts may be ground simultaneously, eliminating chances of error and the need for broader tolerances. Accuracy of the part produced is the chief concern of production, engineering and inspection. Provided the shape or contour of the part lends itself to crush wheel dressing, the dimensional tolerances definitely establish the method of crush dressing and grinding to be followed.

Crush formed wheels may be dressed by different types of rolls, the selection depending upon the part to be ground. The governing factors—quantity of parts required, shape of the contour, and the tolerance specified—help establish the method applicable to the particular job. For any specific work, the method of proper operation, the establishment of roll life, and number of parts obtainable between dressings can best be determined by the judgment and experience of those who have been associated with crushforming of grinding wheels. It is not possible to set up definite formulas or rules to be generally observed on varied types of jobs.

The development of pinking shear blade grinding, using a multiple place fixture for simultaneously grinding 12 blades, as shown in fig. 1, is a good example of the possibilities of cost reduction. The fixture tilts the blade at 4° to equalize side pressure and reduce the differential in surface area per revolution of the wheel or roll. This minimizes frictional slipping thus increasing roll and wheel life. The blades are supported as much as possible to prevent vibration from destroying wheel form.

A second multiple part grinding process is the tandem operation on rifle bolt assemblies, shown in fig. 2. Dual duplicate forms are ground into the Crushtrue roll and transferred to a sufficiently wide grinding wheel. Material is removed in the customary surface grinding manner, al-



LEFT

FIG. 2—The Sheffield idler type roll is used for forming an 18 in. diam x 3½ in. face wheel to grind two rifle bolt bodies simultaneously on a grinder. Quality of finish and form produced by the process enabled substantial reductions in equipment and parts manufacturing costs, as well as in dressing time.

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BELOW

FIG. 3—A partially completed automotive transmission overdrive shaft demonstrates a left hand helical oil groove (0.250 in. wide x 0.030 in. deep x 0.375 in. lead) ground in one pass with 80 grit crush dressed wheel. Grinding time is 18 sec.

though it may also be done by the plunge method utilizing a very slow table feed and full depth cut. The high speed steel rolls used in figs. 1 and 2 are gashed to give a better wheel.

Cylindrical parts are subject to the same advantages. A 1/32 in. deep x ¼ in. wide left hand helical groove with a ⅜ in. lead, 4½ turns, is ground in one pass with a crush dressed wheel in 18 to 22 sec, as shown in fig. 3. An 80 grit vitrified bond wheel, 14 in. diam with 1 in. face width, is used. Wheel profiling is accomplished by crush forming two annular ribs on the wheel, the pitch of the rib being equal to twice the lead of the helical groove, as shown in fig. 4.

Helical interference caused by having the wheel set at zero and moving the part past the wheel at the rate of 0.375 ipr makes it necessary to modify the *Crushtrue* roll, narrowing the groove an amount approximately equal to the cosine of the helix angle, as illustrated in fig. 5.

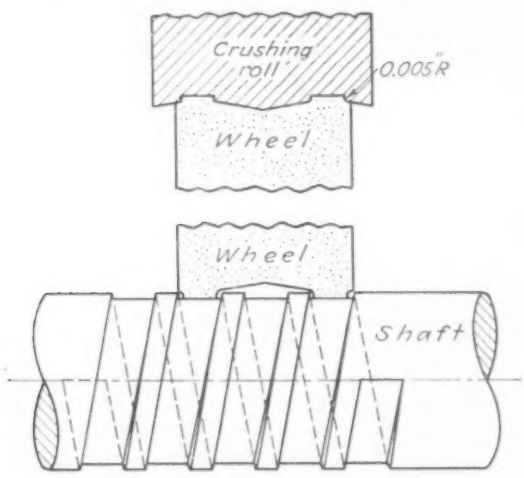
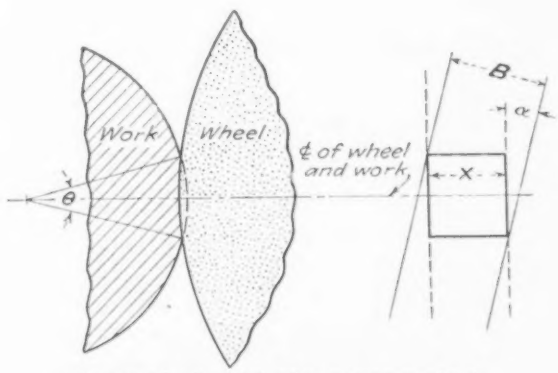


FIG. 4—This is the roll and wheel compensation and development for grinding a helical groove. The two forms on the roll are spaced to twice the pitch of the groove, and are narrower to allow for wheel interferences. They also have a small radius at the major diameter, which, when dressed on the wheel, will top the form and remove the burr normally produced on the outside diameter of ground parts. The grinder table is geared to give a lead of 0.375 in.; the 80 grit wheel is plunged to full depth; and the part makes 2½ revolutions, producing 4½ grooves.

The diameters of the part and wheel also may be governing factors. To further reduce production time, one part may be ground conventionally and the next by climb grinding on the return pass.

Illustrations referred to may be considered as production parts. Therefore, the high speed steel crushing roll was used. Permissible tolerances from the nominal dimensions varied up to 0.002 in. When the problem involves a much smaller deviation from nominal form, a different approach may be initiated to maintain accuracy. These parts are chiefly of a semi or non-production type, and are generally produced in the tool room.

Because of the slight deviation permitted from nominal form, a relatively small number of dressings could be obtained from the roll before its contour would be worn outside the permitted range. To eliminate the high cost of regrinding



θ = Arc of wheel interference or contact
α = Helix angle of thread or form
X = Required width of wheel form
B = Width of form

FIG. 5—Wheel interference is shown here as well as how to use compensated Crushtrue rolls on helical grooves when grinding is done with the wheel spindle centerline parallel to centerline of work.

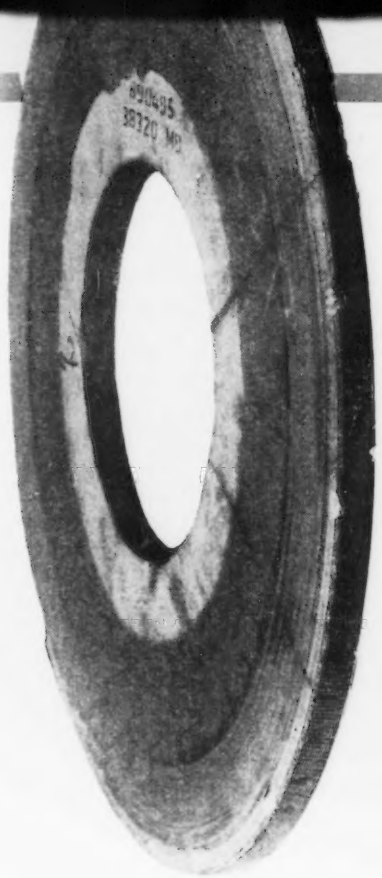


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FIG. 6—This crush formed wheel shows pitting on face and chipping at edges caused by improper roll location, lack of coolant or too rapid infeed.

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the rolls to a 0.0002 in. tolerance and still maintain wheel form, the use of soft rolls, usually of the Meehanite iron types, combined with carbide form tools, was developed.

The form tool is precision ground on a tool grinder used for economically producing special carbide form tools. A unit designed by Sheffield to hold the roll and tool has proper speeds obtainable through the use of pin clutches or shifting devices to give rotation to the roll at 200 to 300 fpm for wheel forming, 25 to 30 fpm for roll shaving, and an idling position for use on machines equipped with a slow speed drive on the wheel spindle.

The unit, being equipped with both roll and form tool, permits initial profiling and reconditioning of form more exactly to the initial contour in a matter of minutes rather than several hours as usually required in regrinding the roll. The tool, being relieved, can also be resharpened rapidly and easily by grinding the entire top surface. The tool remains on center and it is used in the inverted position.

Should abrasive grits embedded in the roll become a problem they can be removed by grinding the roll before shaving. This is accomplished by operating the wheel at grinding speed and using a dressing unit as a circular attachment.

A major problem in both methods is to avoid wheel chipping, flaking or pitting. When this occurs at the edges of the wheel, as in fig. 6, it is usually caused by a too rapid infeed of the crusher roll and can be eliminated by one or more operational changes. Methods recommended are to reduce the infeed per revolution of the wheel, laterally adjust the roll to help strengthen narrow ribs or fins, and increase the flow of oil coolant.

Pitting, occurring on the face of the grinding wheel, is generally caused by loose grits repeatedly passing between the roll and wheel as they revolve, fracturing grains of abrasive that should remain for grinding. The correcting factors are type or quantity of coolant and the addition of a stiff bristle brush to wipe the surface of the crusher roll. In some cases the addition

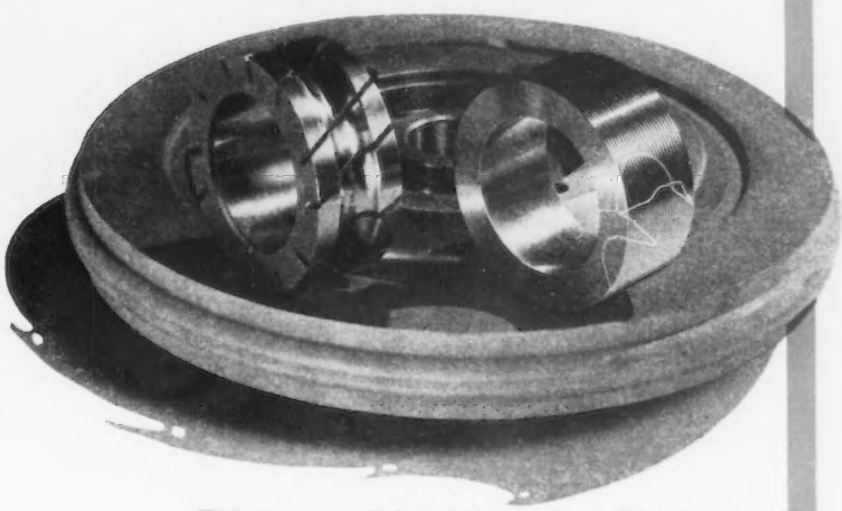

FIG. 7—A properly formed fine grit wheel, 14 in. diam with a face width of 1¼ in. The form is a dual ball race. Crush forming solved a problem by reducing wheel dressing time from a half day to a few minutes. Two wheel forming rolls are illustrated, one with helical grooves for the deep form of the ball race, the other a shallow thread form where "gashing" is not needed.

of a brush on the wheel has proved helpful, especially when the product to be ground is of such a nature as to prohibit the use of coolants other than air.

Helical slots around the periphery are not

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FIG. 8—A properly formed 60 grit wheel 18 in. diam x 3½ in. face width.

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used on Meehanite rolls. These irregularly spaced grooves, commonly known as *gashing*, shown on many high speed steel rolls, are used on deep forms and harder wheels such as the N, O, and P grades. They speed up entry of the roll into the wheel. If *gashing* does not serve this purpose it should be omitted as the grooves only tend to reduce surface inches of form per revolution, thereby reducing roll life.

High speed steel rolls should be used on equipment designated for the production of components having a daily or weekly required quantity. These machines are automatic or semi-automatic in nature, and the duty of the operator is limited to loading and unloading, with the wheel dressing being done at regular intervals set up by the inspector or the process engineer.

An operator of higher skill is required when the Meehanite type of roll is used. He must be able to judge when the roll requires reshaving, the amount it is necessary to remove to restore form, rate of removal to avoid damage to the carbide tool, and when the tool should be reground.

Wheels properly dressed should appear as shown in figs. 7 and 8. Fig. 7 shows a 220 grit, while fig. 8 shows a 60 grit wheel. Both illustrate the clean, sharp profile established by *Crushtrue* forming. The large wheel is 18 in. diam x 3½ in. face width, the other 14 in. x 1¼ in. Wheels as small as 2½ in. diam x 1½ in. face width have been crushtrue formed. Diameter or face width are not governing factors. Wheels 6 in. and 8 in. wide can and have been formed. The determining factors are spindle construction of the machine tool, possibility of applying a slow speed drive where wheel rotation is not sufficiently free to permit rotation by frictional contact with the roll, application of a *Crushtrue* unit in a satisfactory location, coolant supply, and uniformity of infeed during dressing. Rate of infeed should be 0.0001 to 0.0002 ipr of the wheel on a 12 in. to 16 in. diam wheel. The feed, of course, will vary slightly with the form or profile being dressed, hardness of wheel, accuracy required, and machine construction.

Generally, the form on the roll is the same as the form on the part, although on some helical forms it is necessary to modify the roll form to produce correctly formed parts.

Finish is comparable to that produced by similar wheels diamond dressed, although more parts will be obtained between wheel dressings in a shorter period of time with less tendency to burn or surface check the components. Redressing can be accomplished in less than 1 min.

Following these fundamental principles, crush dressing may be applied to external, internal or centerless cylindrical grinders, as well as to surface grinders with these standard wheel truing devices.

New Unloader Speeds Press Operations

A NEW press unloader permits full production possibilities of large presses by speeding the removal of stampings. This unloader, called the "Iron Hand," has increased press production as much as 50 pct in some instances. It is recommended as a safety feature since it makes it unnecessary for a worker to remove stampings from a press.

One of the most distinctive features of this new unloader is the fact that it is entirely self-contained and can be installed on practically all types of presses. As its operating cycle does not depend on the press, the unloader can be timed to remove the panel during any portion of the up-stroke. It can be arranged to lift the panel vertically upward for any desired distance before swinging out. This feature often eliminates the need for spring or air liftouts in the lower die. Stampings can be turned over automatically when operation sequence requires it.

Being a self-contained unit, it is portable and easily changed from one press to another. The unloader is adaptable to the open type press or the enclosed type. The unloader was developed by Sahlin Engineering Co., Birmingham, Mich.

As the ram descends and completes the forming or shearing operation, the device is so timed that the jaw moves into the die taking a firm hold on the panel the moment the ram has raised sufficiently to enable the panel to be removed, as shown in the accompanying illustration. The jaw lifts the panel out of the die and swings it back on to a conveyor or table, after which the jaw returns to its original position awaiting the next panel. The distances of liftout and swing are adjustable to suit different size stampings. The stroke of the jaw is dependent on the length of the arm. The length of the arm is made to suit and is telescoped to provide a 24 in. adjustment.

DOING the job of two men, the "Iron Hand" automatically removes automobile floor from draw press. The device can turn stampings upside down when the following operation requires it, and has been applied to various automotive press operations.

Reinforced Cast Iron

By EUGEN PIWOWARSKY
Aachen, Germany

The benefits obtainable by reinforcing cast iron with cast-in steel inserts and the requirements of the techniques which provide the optimum in strength improvement will largely determine the extent to which the practice is adopted. In this second and final part of a two-part article, additional test data and the author's conclusions on the advantages and methods of reinforcement are presented.

AT the same time that the tests described in the first part of this article were conducted, other research was being carried out at Gebr. Schuren in Witten/Ruhr by E. G. Schuren.[1] Cupola iron produced in daily operations was used. All specimens were poured upright. Pouring temperature was constant at 2555°F, measured with an optical pyrometer. The temperatures were kept so high that a good fusion resulted without the flow-off of excess iron.

Table V shows the compositions of the reinforcing wires used in these tests. The material designated Si was a spring steel; the materials designated wire A to D corresponded to medium hard steel wire.

Table VI lists the strength of the reinforcing materials, and the composition of cast irons used is given in Table VII. All cast irons except that in test 6 were high in phosphorus content. Phosphides in appreciable amounts occasionally caused a banded pattern of phosphides along the fusion line and the strength declined markedly. The high pouring temperature almost always produced a reliable fusion. Tensile, bending and notch impact tests were carried out. Square bars, 1.2 x 1.2 x 26 in., were chosen for the bend tests (distance between supports, 20 x the diam). Some of these results are summarized in Tables VIII and IX. In all cases reinforcement produced a considerable increase in strength. No deflection values were measured. The silicon-containing spring steel showed itself superior as reinforcing material in all cases.

In order to picture the probable stress relationships in the base material and the reinforcing material, tension stress relationships and stress relationships in bending tests were considered.

[1] *Arbeit E. G. Schuren, Tech. Hochschule Aachen (1941).*

Translated and abstracted by J. S. Vanick and H. H. Tanner, International Nickel Co., New York.—Ed.

A series of calculations showed that for a fixed amount of reinforcement with steel of constant strength, a composite iron-steel casting when deformed in tension beyond the elastic range of the cast iron, throws increasingly greater stresses upon the steel. The relative stress values in Table X are proposed for equal deformations at successively greater loads.

The case of a small amount of steel embedded in a high grade cast iron and loaded beyond the yield point of the steel would indicate that at the breaking load on the cast iron, the steel must also break.

A test was made to check the stress relationships between cast iron and steel over the reinforcement range of 0 to 100 pct. Bars of 1.2 in. diam, of cast iron containing 3.6 pct C, 1.7 pct Si and 1.6 pct P, possessing a tensile strength of 32,000 psi, were produced, which were reinforced exactly in the center with a steel wire of 0.236 in. The steel had a carbon content of 0.5 pct and a

silicon content of 1.7 pct. After a 10-min anneal in a reducing atmosphere at 2190°F, the tensile strength was 128,000 to 142,000 psi, elongation to 4 to 6 pct. Hence in the composite casting a strength of about 128,000 psi could be attributed to the reinforcing wire. The bars were then notched to various depths with a large radius ($r = 0.472$ in.), and the tensile strength determined. The values in Table XI were obtained.

The result of this test does not come up to expectations. First of all, at a reinforcement of about 20 pct, the average strength of the composite bar increases somewhat more than estimated additively from the original values of the synthetic materials. From 50 pct of area reinforcement, upwards, however, an obvious decline in strength can be observed. Whether this is due to the weakening influence of the fusion zone or is connected with the effect of the thickness of the cast iron, could not be decided. The true tensile strength of the steel wire may have been changed by contact with the liquid cast iron.

Table IX shows the tensile properties of melts 5 and 6. The values found correspond to a composite value and are neither characteristic of the base material nor the reinforcing material. It is recognized that according to expectations, the composite strength increases considerably with increasing reinforcement, a fact which should be of special importance for the designer. Otherwise, as was to be expected, the modulus also decreased with increasing stages of stress

Bending Stress

The difficulty of calculating stress relations in transversely loaded castings should be emphasized. Formulas indicate that with too much reinforcement the stress capacities of the inserts are incompletely utilized. Mathematical estimates of stresses in the inserts considerably exceeded the actual strength of the inserts. Therefore, the cast iron envelope, in spite of its lesser modulus of elasticity, participated considerably in absorbing stress. The author believes that the reinforcing wires fail prematurely due to small flaws in the fusion zone which produce a local overstressing leading to breakage. Once a surface crack occurs on the tension side of the reinforced bar, this propagates quickly in the nonductile cast iron to the reinforced areas; the reinforcing wires must then take over practically the whole tensile load, which, however, is possible only if the total cross-section of area of the reinforcing wires is adequate.

The designer thus will have to decide whether he wishes to give preference to a lighter reinforcement, combined with better use of reinforcing material, or a heavier reinforcement with increased security against rupture.

A special case of reinforcement would be presented in the case of a beam in which the area stressed in tension should consist of steel, while the area stressed in compression should be of cast iron.

With consideration for economy in high quality steel it would be advantageous to construct only the outer parts of the tension sides of steel throughout, since the lesser tension forces near the neutral fiber could be absorbed by cast iron alone. Accordingly, the half on the tension side could be made suitably of steel, either by com-

TABLE V

Compositions of the Reinforcing Wires

Designation	C, pct	Si, pct	Mn, pct	P, pct	S, pct
Si	0.48	1.68	0.73	0.032	0.026
Wire A	0.40	Trace	Not determined	0.020	0.025
Wire B	0.44	Trace	Not determined	0.024	0.024
Wire C	0.60	0.18	Not determined	Not determined	Not determined
Wire D	0.45	0.20	Not determined	Not determined	Not determined

TABLE VI

Tensile Strengths of the Reinforcing Wires

Material	Diam., in.	Tensile Strength,[1] psi
Si	0.114	16,500
Si[2]	0.110	94,500
Wire A	0.165	95,000
Wire B	0.165	124,000
Wire C	0.165	148,000
Wire D	0.205	101,000

[1] Average of 3 tests.
[2] Heated to 1830°F, annealed 10 min, allowed to cool in furnace.

TABLE VII

Composition of Test Cast Irons

Melt	C, pct	Si, pct	Mn, pct	P, pct	S, pct
1	3.75	1.92	0.46	1.62	0.108
2	3.52	2.05	0.45	1.76	0.078
3	3.38	1.98	0.48	1.61	0.084
4	3.50	1.62	0.36	1.70	0.092
5	3.60	1.71	0.45	1.59	0.124
6	3.30	2.38	0.58	0.68	0.054

TABLE VIII

Tensile and Bend Strengths*

Melt	Reinforcement	Reinforcement pct of Area	Transverse Strength, psi	Tensile Strength, psi	Pct Increase by Reinforcement	
					Bend	Tensile
1	None	0.0	39,000	25,800	.....	.....
	Wire A	5.7	43,600	31,000	12.7	20.2
	Si	5.2	43,000	31,200	11.1	20.9
2	None	0.0	51,500	31,700	.....	.....
	Wire B	5.7	55,100	35,500	7.0	12.0
	Si	5.2	65,650	40,200	27.5	27.0
3	None	0.0	44,000	31,200	.....	.....
	Wire D	5.67	46,100	32,300	4.9	3.7
	Si	7.8	48,900	37,700	11.1	21.0
4	None	0.0	66,000	38,000	.....	.....
5	None	0.0	58,000	32,800	.....	.....
	Wire C	10.6	67,800	34,650	17.0	5.6
	Si	10.6	69,000	35,750	19.0	9.0
6	None	0.0	69,000	36,000	.....	.....
	Si	10.6	78,650	43,200	14.0	20.0
	Si	14.2	83,100	47,000	20.5	30.5

* Averaged from three tests.

TABLE IX

Tensile Strengths and Elastic Moduli

Melt	Pct Reinforcement	Tensile Strength, psi	Modulus in Tension, lb x 10^6				
			5000	9500	14,000	18,000	23,000
5	0.0	33,000	.....	.....	.....	.....	.....
	10.6 (Wire C)	35,000	16.7	16.1	14.8	14.4	.....
	10.6 (Si)	36,500	16.7	15.9	15.7	15.5	.....
6	0.0	38,000	17.2	15.9	15.7	15.5	13.4
	10.6 (Si)	43,000	20.0	19.2	18.8	18.6	18.5
	14.2 (Si)	47,000	25.0	23.8	22.0	19.5	18.8

posite casting or by solid mechanical joining by means of screws or rivets.

Summary

(1) Cast iron reinforced with steel and satisfactorily fused produces an increase in strength exceeding estimated additive values computed from percentage area of steel reinforcement. The increase in strength reaches values exceeding 30 pct, with 5 to 10 pct reinforcement.

(2) Pouring temperatures of 2460° to 2590°F are necessary to achieve perfect fusion of the steel inserts, with a reinforcing ratio up to 5 to 10 pct. Higher reinforcement ratios require higher pouring temperatures or flow-off of excess iron from the mold. Temperatures of the cast iron below 2280°F lead to failure to establish an intimate fusion between the two materials. Introducing silicon-rich powder by means of a paste, or a suitable precipitation of silicon from steam or gases, favors fusion by the heat of reaction set free when the iron and silicon combine.

(3) In order to utilize the higher values of the reinforcing materials under bending stresses, the steel inserts are planted on the tension side, and removed as far as possible from the neutral axis.

(4) By using silicon-containing reinforcing steels with 1.5 to 3 pct Si, the formation of brittle, strength-sapping cementite network in the structure in the fusion zone is prevented.

(5) It is expedient to choose silicon and carbon content of the reinforcing wires so that the recrystallization temperatures of this material lie below 1830° to 2010°F, in order to prevent coarse grain formation when cold-worked reinforcing steels are used. Steels with carbon contents between 0.45 to 0.65 pct, and with silicon content between 1.5 to 3 pct are favorable.

(6) For increasing strength in reinforcement, the use of reinforcing materials with high yield limits and high yield limit ratios (yield point/-tensile strength) are of special advantage. The use of alloyed reinforcing steels appears especially promising.

(7) Reinforcement ratios between 3 to 8 pct lead to better utilization of the strength properties of the reinforcing material. Reinforcing ratios between 8 to 15 pct lead to greater security against rupture under bending load. Reinforcement ratios over 15 pct are to be considered only in special cases.

(8) Reinforcing brings the greatest advantage when stresses are dynamic. The specific values for impact could be raised with suitable tests approximately 3 to 4 fold.

(9) Stress relationships were calculated by use of approximate formulas and compared with the results of the reinforcing tests.

(10) The possibility of widespread use of steel for tension areas of reinforced beams combined with high quality cast iron for compression areas is discussed and shown to be advantageous.

TABLE X

Relative Stress Values

Cast Iron, p i	Steel, psi
14,000	30,000
26,000	65,000
34,500	105,000
40,000	137,000

TABLE XI

Tensile Strength of a Reinforced Cast Iron Bar Increasingly Notched.

Steel Diam, in.	Cast Iron Diam, in.	Pct of Area Reinforced	Tensile Strength, p i
0.236	0.551	18	53,000
0.236	0.472	25	56,000
0.236	0.394	36	38,000*
0.236	0.323	53	67,000
0.236	0.642	97	110,000
0.236	0.236	100	128,000 to 142,000

* Flaw.

Handbook on Radioactivity and Tracers

A HANDBOOK of radioactivity and tracer methodology which covers not only tracer techniques but also some of the fundamental concepts of nuclear physics, isotope production and instrumentation has been prepared by the Air Materiel Command of the U. S. Air Forces.

Probably the most comprehensive work of its kind, this 900-page book contains three main divisions; Nuclei and radioactivity; measurement of isotopes; and biological and medical applications of isotopes. In addition, the report contains a very complete bibliography.

While the original intention of compiling the book was a simple presentation of data and formulae, it was considerably expanded to make it more intelligible to individuals less conversant with the terminology of nuclear physics and tracer methodology. Copies of the book, entitled "Handbook of Radioactivity and Tracer Methodology," may be obtained at a cost of $20 per copy from the Office of Technical Services, Dept. of Commerce, Washington 25.

Portable Jig Borer Cuts Costs

A PORTABLE jig boring tool to expedite precision work on forgings or castings that are assembled on major airplane components has been used successfully for several months. Savings have been considerable in boring various parts with this jig boring tool, instead of on standard machine tools, in the various plants of Consolidated Vultee Aircraft Corp., where the tool was developed. It is especially adaptable to jobs where the work is too large to handle on stationary boring machines or where parts are already installed in complete major assemblies.

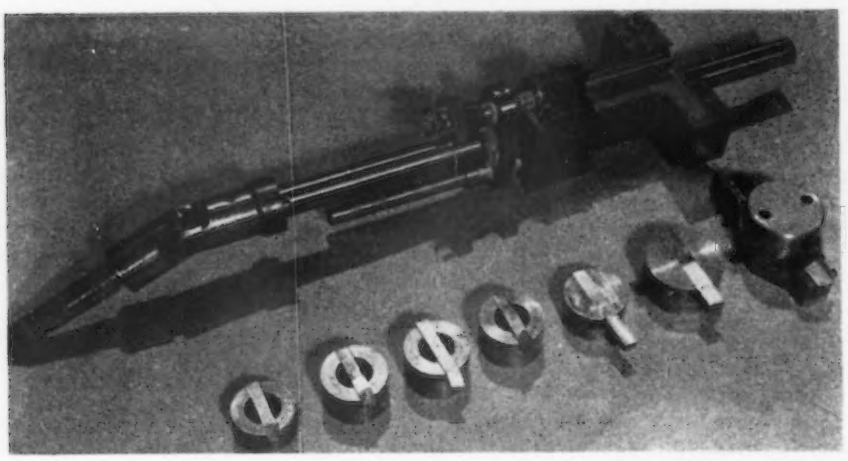
The device is made up of a block base having a face-normal alignment hole; a precision calibrated disk for feeding the cutting tool; a concentric boring bar with a universal drive joint at its upper end and a cutting tool insert at the lower end; and a balanced feed arm to assure rational cutting and feeding speeds for the device. Auxiliary attachments, including a drill end adaptor bar, a step-pin ended bar, a boring bar with adjustable tool attachment, a pickup bar for tooling buttons, and a set-up adaptor plate, can be used. The tool can be driven by any conventional electric or pneumatic hand motor.

Before development of the new portable unit, it was necessary to locate and fasten certain workpieces and jigs on the surface table of large standard jig boring machines. In many instances, the work involved expensive disassembly of the part to be worked from its major component. Setting up the jig bore required labor time and tied up a machine needed in regular production work. Some jobs were too large to set up on standard machines and had to be shipped to firms with larger tools. Others required large jacks, with the risks of damage involved in handling.

The comparatively simple tool can be manufactured for approximately $300. The unit will accomplish boring to very close tolerances (±0.00025 in.) and can be used for a large number of complex jobs.

A job on an engine mount tie-in bolt that would have taken at least a week was accomplished with the portable tool in 3 hr at Convair's plant. The usual method of reworking a hole that is not in relation to a motor mount hole is to construct a special jig, which requires costly drills, reamers, and spot facers. This particular job was handled by the portable jig bore set up on an existing checking plate. The plate was then pinned to two correct motor mount holes, and the simple operation of boring and spot facing completed the job.

The jig bore can be used to rebore holes which ordinarily require costly lathes or boring mills. For reboring holes on tractors, oil-field machinery and similar equipment, where the job of disassembling units is costly, the portable jig bore would be very useful and economical. It could also be used in overhauling automobile engines for such operations as seating valves, boring for valve inserts, and reboring cylinders.



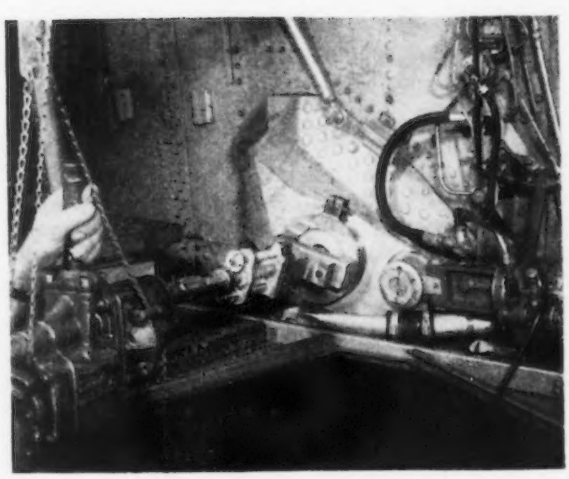
LEFT

FIG. 1—Various precision-set cutting tool adaptors, such as boring heads and chamfering tools to spot-facing adaptors, are used with the portable jig borer.

o o o

BELOW

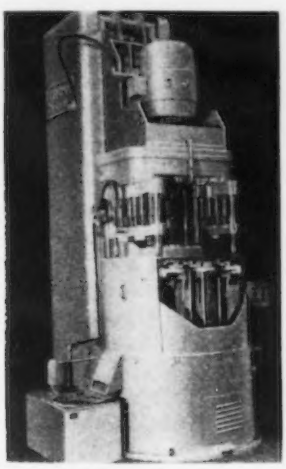
FIG. 2—A landing gear forged attachment fitting is shown being jig bored after its assembly to the structure of a Convair airplane. A conventional Chicago Pneumatic power tool is employed for turning the boring bar and the off-set is permitted by the universal drive.



New Production Ideas . . .

A special drilling machine, a rotary cold molding press, single end punching machines, an impact hammer, dual-fuel diesel engines, a pipe fatigue tester, a diesel piston inspection instrument, dipping and agitating machines, a paint spray booth, filters, drill jigs, tap holders, corrosion inhibitor rods, and a rust preventive vapor wrapper are described in this issue.

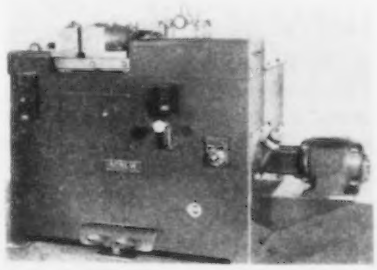
DRILLING, countersinking, and reaming five holes in the flanges of automobile rear axle shafts at the rate of 225 pieces per hr can be accomplished on a recently developed special machine. It is a four-station, power operated, index table type, with an independent loading station. Two pieces are handled at each station. Independent floating work holding fixtures insure concentricity between the holes and pilot diameter.



Flexibility for part design changes is provided through the use of a standard column and index table. Feed and rapid traverse are hydraulically operated. Control of the automatic work cycle is by pushbutton. *Cross Co. For more information, check No. 1 on the attached postcard.*

Flash Welder

A HYDRAULICALLY operated flash welder that is automatic except for loading and unloading has a hydraulic pump that supplies the pressure to actuate the movable platen and a flow valve that controls the flash cycle. Air is used for clamping, and dies are replaceable. The tap switch on the transformer provides a wide heat range for diversified production. The machine is equipped with water-cooled 50 kva transformer



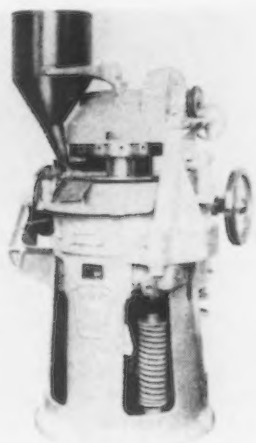
and clamps, welder type magnetic contactor and pressure controls. *Agnew Electric Co. For more information, check No. 2 on the attached postcard.*

Spiral Carbide Drill

FOR deep hole drilling in aluminum, magnesium and soft plastics, a new line of fast spiral, carbide tipped drills is offered in sizes 3/16 to ½ in. The drills are available in corresponding letter and wire sizes and have straight shanks. *Super Tool Co. For more information, check No. 3 on the attached postcard.*

Cold Molding Press

HIGH production cold molding of a variety of parts is possible with a new fully automatic, 15-ton capacity, rotary press. The unit is equipped with an automatic safety release and pressure equalizer to prevent jamming and undue strain on machine and punches when overloaded. Cold molded parts are said to be of high and uniform density with full pressure applied from above and below. Adjustments for pressure, thickness of the piece, and speed of the press can be made during press operation. Shouldered, flanged, and other parts requiring different levels of compression are produced at high speed. A core rod attachment can be furnished when holes or perforations are required. This press is designed to take pieces up to a maximum diam of 1 7/16 in. and maximum die fill of 2 1/16 in.



F. J. Stokes Machine Co. For more information check No. 4 on the attached postcard.

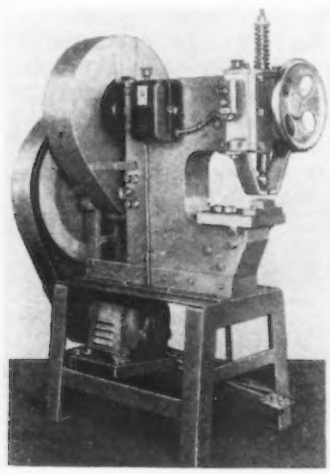
Heat Treating Furnace

A FURNACE for the heating of spring-leaves prior to forming has been designed with a conveyer mechanism of a series of four stationary alloy rails running the full length, which support the leaves as they are moved through the furnace; and three pusher type walking beam alloy rails. The movable rails are driven by a combination mechanical and hydraulic drive. A series of fingers on top of the walking beam rails push the springs forward approximately 2½

in. at a time, lowering and returning, and then coming up between the next leaves. At the discharge end of the furnace, there are doors on each side for removing the work. Production is rated at 3600 lb per hr. *Bellevue Industrial Furnace Co. For more information, check No. 5 on the attached postcard.*

Single End Punching Machine

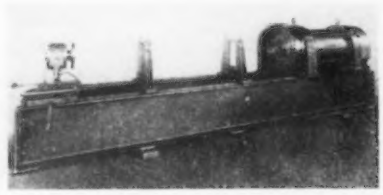
ADAPTED for punching webs and flanges of light beams and channels, the Model P9 quick acting single end punching machine is designed with 12 in. depth of throat, overhanging die block, and is rated at 60 strokes per min. Capacity in soft steel is 9/16 through ½ in. and ¾ through ⅜ in. The frame



is steel plate, crank shaft is chrome-nickel steel, and the punch plunger is forged steel. The punch can be lowered by hand so as to assure exact centering. The clutch is non-repeating. A triple punch attachment is furnished as optional equipment enabling the selection of any one of three punch sizes. Other special attachments can be furnished for cutting or notching angles and for cutting flats, rounds and squares. The unit with motor weighs 1400 lb. *Julius Blum & Co., Inc. For more information, check No. 6 on the attached postcard.*

Pipe Testing

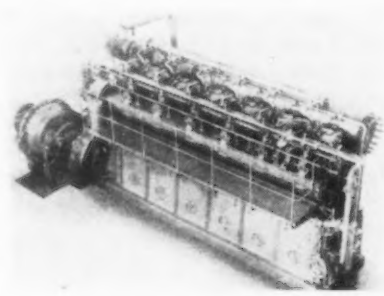
FOR fatigue testing pipe spans of 2 to 10 ft long and up to 8⅝ in. diam under loads encountered in service, a rotating beam fatigue machine of 1,200,000 in-lb capacity is now available. It is 7½ x 20 ft, and 4 ft high. Pipe specimens, mounted as a cantilever beam in the machine, are subjected to bending loads and rotated in a horizontal position by a 20-hp electric motor at variable speeds up to



1000 rpm. Load is applied by a calibrated spring that is compressed hydraulically with a hand pump. Bending loads are indicated on a removable dial in units of approximately 6.7 lb. The machine may be shut off automatically after a predetermined deflection. *Baldwin Locomotive Works. For more information, check No. 7 on the attached postcard.*

Dual-Fuel Diesel Engine

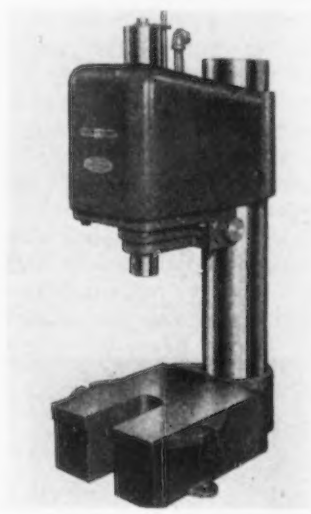
A NEW two-cycle, 21½x27½-in. dual-fuel diesel engine features fast, easy change-over from gas to oil and oil to gas, and engine rating of 425 hp per cylinder in sizes of five to ten cylinders. It is designed for operation on low-pressure gas with extremely low pilot fuel requirements. Fuel economy is reported throughout the complete load range, and combustion under all loads is complete and quiet. Pilot fuel requirement rates as low as 8 1/3 lb per hr per cylinder under test at 90 pct load. Control of air temperatures to the engine is maintained by a cooler



between the scavenging blower and the engine. Gas injection in closely metered quantities, starts as the exhaust ports are closing, thus compressing the gas with the entrapped air. Safety devices include quick closing valves in each cylinder and an underspeed governor. *Lima-Hamilton Corp. For more information, check No. 8 on the attached postcard.*

Impact Hammer

DEVELOPED to replace punch presses, the Model Z-6 air impact hammer is recommended for applications such as light stamping, small forgings, straightening steel castings, trimming, molding, crimping, coining, riveting, piercing, staking and forming in a variety of materials. Stroke is constant and impact may be varied from 2800 lb to max capacity of 40,000 lb. A 100-lb pressure line is required and air consumption is 1 cu ft for 15 strokes. Moving parts subject to wear are hard chrome plated. Speed of operation

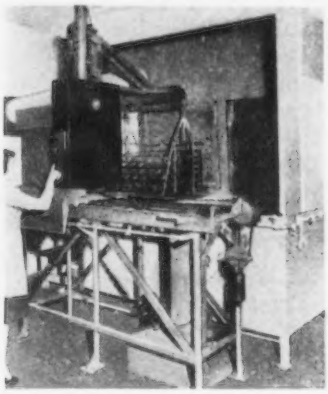


by hand or foot control is approximately 60 strokes per min. *Blank Machine Tool Co. For more information, check No. 9 on the attached postcard.*

Dipping Machine

WIDE applications in industries requiring consecutive dipping and controlled agitating operations is claimed for a new automatic dipping and agitating machine that eliminates constant supervision by operators, handling, variations and errors, and achieves uniformity of product. By placing the load in the container and pushing the start button, the load is automatically lifted to the first tank, dipped, agitated for a predetermined time interval, then automatically lifted and moved to the second tank for dipping and agitating. The machine then either returns the load to the first tank or moves it to a third one. The entire cycle continues until the number of cycles is completed

as preset on the built-in counter, at which time the load is automatically returned to the starting position. The stop button pushed at any time during the cycles will return the load to the starting po-



sition after completing that particular dipping and agitating operation. An unlimited number of tanks may be arranged within the cycles of the machine. *Wiesner-Rapp Co. For more information, check No.* 10 *on the attached postcard.*

Piston Inspection Instrument

SIMULTANEOUS check of 11 critical dimensions and determination of one of five skirt diameter classifications of diesel pistons can be accomplished with the Multichek illustrated. Interchanging the gaging points and locating cups permits any of 13 differ-

ent pistons within 3¼ to 4¾ in. diam to be checked and classified. The master light shows at a glance whether all dimensions are within specified tolerance limits by changing from red to white, with individual signal lights showing whether the dimensions are under or over tolerance limits. The Electrigage head mounted in the case casting permits easy and quick classification in any of the five classification ranges, according to the skirt diameter. *Sheffield Corp. For more information, check No.* 11 *on the attached postcard.*

Speed Reducer

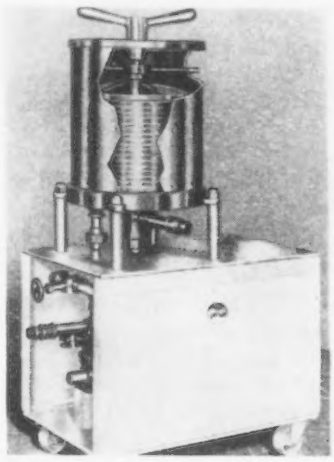
A NEW small size single reduction speed reducer, designated BHS, is a right angle drive with the input shaft below and the worm gear or output shaft above. The worm is carburized steel and the worm gear is made of special nickel bronze for strength and low friction coefficient. Overall dimensions are: 4¾ in. long, 3 in. wide, and 6¼ in. high. Ratios available range from 6:1 to 58:1. Input hp is from ⅛ to ⅝ and output torque at 1800 rpm input, ranges from 103 to 168 in-lb depending on ratio. Input shaft diam is ½ in. with a 1⅝ in. extension; output shaft diam is ⅝ in. with a 1 15/16 in. extension. Housing is aluminum alloy. The base is 5 in. wide and 4¾ in. long. *Ohio Gear Co. For more information, check No.* 12 *on the attached postcard.*

Portable Filter

A SMALL, compact, portable filter has been developed for the filtration of chemical solutions. It is 17x8x26 in. and weighs 70 lb, and is available in stainless steel, brass, iron, and Saran, with rubber lined tanks. This model has a small positive displacement pump rated at 275 gph and is powered by a 1/3 hp motor. The unit can be carried from tank to tank for batch work or can filter continuously on a specific tank. It is self-cleaning and requires no parts, such as bags, sheets, or pads. *Titeflex, Inc. For more information, check No.* 13 *on the attached postcard.*

Cylinder Type Disk Filter

A NEW cylinder type disk filter for plating solutions incorporates the principle of double closure to insure a positive seal. The filtering elements are independently tightened from the cylinder. This method permits the use of various types of rigid filter media in any number up to the rated capacity of the filter. After the filtering elements are sealed the outer cylinder is independently closed by a separate handwheel. Due to the enclosed principle there is no loss of liquid due to evapora-



tion or drippage, a feature which makes the filter adaptable for handling volatile liquids. Reloading and cleaning are simple as the head and cylinder are removable, exposing the entire unit. *Ertel Engineering Corp. For more information, check No.* 14 *on the attached postcard.*

Paint Spray Booth

IN the new Dunaprecipitor paint spray booth, overspray and fumes pass through a curtain of

water and are treated to five successive scrubbings. This removes and collects all paint solids and pigment for disposal or reclamation, and paint never reaches the exhaust stack to deposit on fan blades. There are no nozzles or

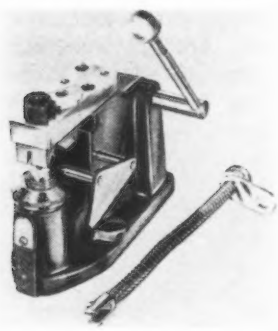
dead ends to clog or accumulate deposits. The water is constantly recirculated and only enough water is added to compensate for evaporation losses. The units are made in a large number of stock sizes for ready erection. To meet special requirements, individual installations have been engineered. Where finishing is done simultaneously from both sides of the work, installations are equipped with downdraft or tunnel exhaust. *Binks Mfg. Co. For more information, check No.* 15 *on the attached postcard.*

Heavy Duty Drill

FEATURING light weight and reserve power, a pistol-grip type of electric drill is available in three drill size capacities and five rated speeds: ⅜ in. at 650 rpm, 5/16 in. at 1000 rpm, and ¼ in. at 2000, 3500, and 5000 rpm. Motor brushes and commutator are accessible without dismantling the drill. The control switch is in the pistol grip and is a heavy duty two pole type, *Milwaukee Electric Tool Corp. For more information, check No.* 16 *on the attached postcard.*

Drill Jig

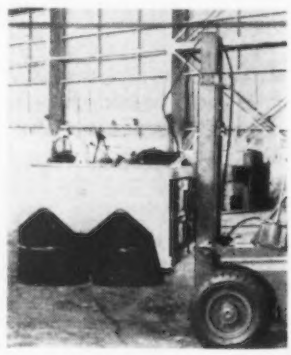
THE new Model X-750 Kam-Grip drill jig is said to combine flexibility, speed and accuracy.



The work part is positioned in a V locating block on the underside of the bushing plate, assuring accurate centering of the work. One double-end anvil and one bushing plate are used to make the jig adjustable to handle work from ⅛ to ¾ in. diam with drill sizes up to 11/32 in. Clamping is by cam action that actuates the anvil vertically to and from locking position, operating either manually or automatically. *Manufacturers Engineering Service. For more information, check No.* 17 *on the attached postcard.*

Drum Carrier Attachment

THE Tray-Hart multiple drum carrier, designed to pick up, carry and tier two or four 55-gal drums, is a special handling attachment for use on Clark fork trucks. The device fits over the top of drums, lifts and moves them



without need for a pallet. The clamping shoes which grip the drums are actuated by hydraulic power taken from the fork trucks hydraulic lift mechanism, with the weight of the drums serving to increase the tightness of the grip. The carrier unit is easily interchangeable with standard forks and installation requires only a few minutes. *Clark Equipment Co. For more information, check No.* 18 *on the attached postcard.*

Light Duty Cleaner

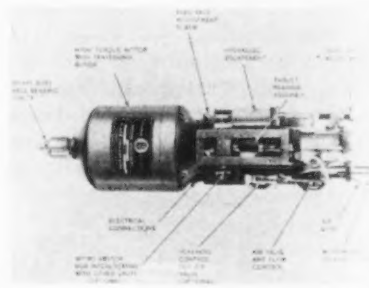
A NEW light duty hand type cleaner provides power for removing grit, dust, and dirt from machines, shelves, overhead pipes, etc. A blower nozzle and other attachments are available for vacuuming, spraying and drying. The unit has a ½ hp continuous duty, universal motor. Air velocity at the blowing nozzle is 18,000 fpm. Suction air volume is 120 cu ft per min. The waterlift is 28 in. *Ideal Industries, Inc. For more information, check No.* 19 *on the attached postcard.*

Portable Elevator

OPERATED by one man, the 500 portable elevator is adaptable where loads up to 500 lb must be lifted from 1 to 5 ft. Applications include placing dies in presses or die racks, loading and unloading motor trucks, piling cases, barrels or bales, elevating materials into storage, raising loads to platforms, and for ceiling and lineshaft repairs. The crank is turned in one direction for raising platform and reversed for lowering, with micro adjustment. Capacity loads may be stopped at any point. This model is built in one size; has an overall height of 6 ft, lifting height of 5 ft, and platform 24 in. sq. The base of the load handled is limited to 30x42 in. The platform when lowered is 5¾ in. from the floor. *Barrett-Cravens Co. For more information, check No.* 20 *on the attached postcard.*

Drilling Unit

A NEW drilling unit that features a single rotating member, uses a traversing motor shaft for the work spindle. Because spindle and motor rotor are integral, torque is applied evenly around the spindle. Air feed gives rapid shockless advance to the work with hydraulic control from this point until the work cycle is completed. The micrometer stop insures depth drilling accuracy to within 0.001 in. Drilling units from ¼ to 1 hp have the same base-to-center-of-spindle dimension. Speeds available are 840, 1150, 1725, 3450 rpm for voltages of 209, 220, 440, 550, three phase, 60 cycle. Standard units



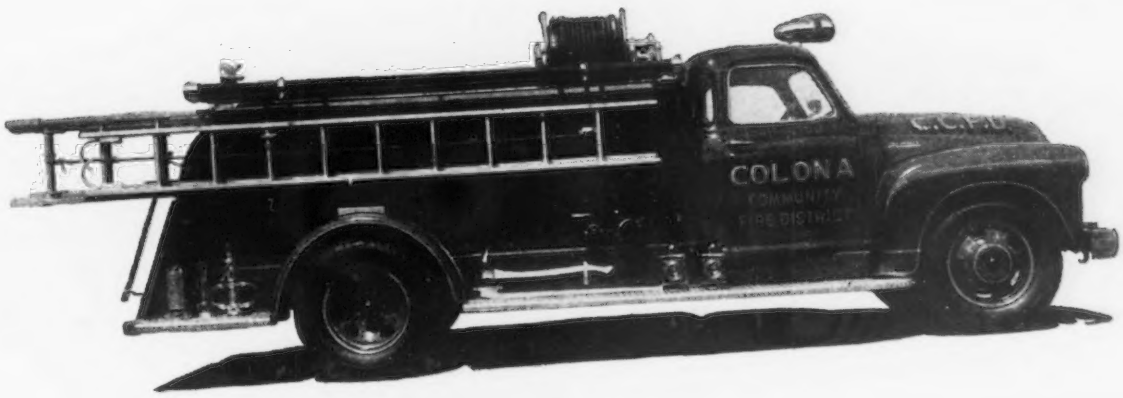
will operate in any position and may be used for drilling, tapping, centering, chamfering, counterboring or any application where a combination of rotating and traversing motions is required. *Black Industries. For more information, check No.* 21 *on the attached postcard.*

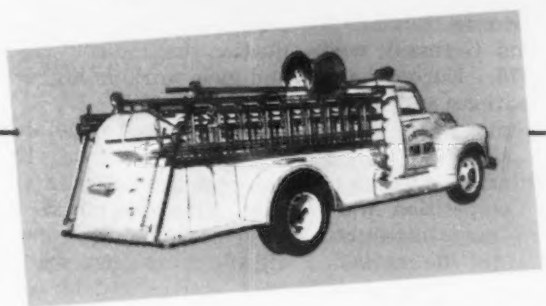
Tap Holder

A FLOATING-releasing tap holder is designed to correct for parallel and angular misalignment to assure accurately tapped holes; to not bind or freeze under tension or compression; and to float taps out of holes freely, when used on turret lathes or automatics.

"INCREASED EFFICIENCY...DECREASED COSTS WITH N-A-X HIGH-TENSILE STEEL"

Fire Fighter Truck Company, Rock Island, Illinois





Here is what the Fire Fighter Truck Company of Rock Island, Illinois has to say about N-A-X HIGH-TENSILE steel.

"In the use of this steel, we have increased the efficiency of our fire trucks and at the same time decreased our construction costs. We are now permitted to increase the hose carrying capacity using the same gauges as we formerly did with plain hot rolled sheet steel.

"The added strength of N-A-X HIGH-TENSILE permits us to install booster tanks of larger gallonage. The corrosion-resistant properties of the steel has shown to good advantage in that longer life is noted in our booster tank.

"We have found that in applying paint to this steel we can secure a better and longer lasting bond due to its impact- and abrasion-resistant qualities. These same qualities reduce shop imperfections from abrasion and impact, thus reducing surface refinishing prior to painting."

The high physical properties of N-A-X HIGH-TENSILE steel can help *you* increase your production . . . improve your product . . . reduce your fabricating costs.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N-A-X
HIGH-TENSILE STEEL

GREAT LAKES STEEL CORPORATION

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

Assembly Line . . .

WALTER G. PATTON

• Auto industry produces 100 millionth vehicle . . . Purchase of Willow Run by K-F sets stage for bigger things from Henry Kaiser . . . Ford boats establish new record.

DETROIT—The automobile industry took time out this week to celebrate the production of its 100 millionth motor vehicle.

Secretary of Commerce, Charles Sawyer, paid a fitting tribute to the motor industry, observing that the motor car has indeed changed the entire pattern of living in the United States.

Mr. Sawyer's talk was broadcast nationally in this country. It was also beamed to the far corners of the world on the U. S. State Dept. "Voice of America" program. K. T. Keller, president of Chrysler Corp. was toastmaster. George W. Mason, president of the Automobile Manufacturers Assn. and president and chairman of the board, Nash-Kelvinator Corp. presided.

With the exception of C. E. Wilson, president of General Motors who is in Europe, all of the top ranking executives in the motor car industry attended the dinner.

Following Secretary Sawyer's address, Charles F. "Boss" Kettering, famed GM inventor and scientist, regaled the audience with one of his best "off-the-cuff" performances. Mr. Kettering's crisp comments ran the gamut from rubber tires to petroleum to internal combustion engines.

Despite the fact that we have already built 100 million vehicles, Mr. Kettering told his audience, our opportunities are still as limitless as our imagination.

In the Detroit papers this week double-page advertisements appeared under the title "How Free Enterprise Made Possible the 100 Millionth Motor Vehicle."

The well-known comic strip technique was used to drive home the fact that long before automobiles were being made in this country they were well known in Europe. According to the advertisement, all the basic automotive inventions actually were known in England, France, Austria and Germany between 1801 and 1876. Europe had the materials, inventions and markets. It did not have free enterprise.

In Europe the automobile was the rich man's toy. Competition was not permitted and manufacturers fixed prices and divided the market among themselves. With restricted production, the advertisement continued, many of the parts were made laboriously by hand. Wages were kept low. Europeans continued to walk.

The beginnings of the automobile industry in this country were fraught with difficulty. Bankers refused to invest in "anthing so impractical as auto companies."

According to the advertisement, "free enterprise" permitted individuals to enter any business they chose. In quick succession Henry Ford, R. E. Olds—a total of more than 1500 concerns started to build automobiles. Ford set up shop in 1903, 7 years after making his first car. The original capital was $28,000 and not another dollar was ever invested or borrowed.

In 1908 Ford split with his original backers and brought out the famed Model T. Meanwhile, men like Henry M. Leland, applying precision methods, found they could double the horsepower of a car.

In 1913 when Henry Ford installed the new conveyer assembly line, production time was cut from 14 hr to 80 min. This enabled Ford to sell the Model T for $365.

THE ad pays tribute to Charles W. Nash, Walter P. Chrysler, W. C. Durant, Roy D. Chapin, William S. Knudsen and others who brought the industry to its present status. Finally, it points out that while the United States has produced 100 million vehicles, 24 million have been produced in all the rest of the world combined.

"Competition for profits in the industry, without which there could have been no expansion, has resulted in better cars, increased production that multiplied employment, and gave workers higher wages and shorter hours."

AMA has also pointed out that nearly one eighth of the 100 million cars produced in this country have been assembled during the three postwar years, despite an uphill fight against material shortages, strikes and increased production costs.

Total vehicle production during the past 36 month period is 11,889,400, including 3,341,700 trucks and buses and 8,547,700 passenger cars.

Production during 1948 has already exceeded 5 million and is now heading for the 1929 record of 5,358,000 vehicles.

Replacement parts continue to be turned out at triple the prewar peak rate, according to AMA.

A lighter touch at the AMA dinner which is particularly appreciated in Detroit was K. T. Keller's definition of a competitor: "A competitor," according to Mr. Keller, "is the fellow who follows you into a revolving door, but comes out ahead of you."

HENRY KAISER seems to have an unlimited capacity for confounding his critics. Recently when K-F laid down $1,510,000 as the

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Put new thread gages to work without checking them? Some experienced gaging men might protest at the very thought.

Yet that's what's happening in hundreds of plants that regularly get their gages from Pratt & Whitney. They *know* from experience these gages will be right — this whole line of standard and special thread gages. *Right* not only because they're carefully checked by Pratt & Whitney before shipment, but right *also* because they're precision lapped to a degree of mechanical perfection impossible to achieve without Pratt & Whitney special lapping equipment.

It cost Pratt & Whitney years of patient experimenting to create the special lapping machinery. Anybody can see for himself the benefits it brings.

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"THERE IS NO BETTER-PAYING INVESTMENT THAN THE RIGHT TOOLS FOR THE JOB"

down payment on its Willow Run plant, it served notice on the industry that the company is in the automobile business to stay. K-F will pay a total of $15 million for the Willow Run plant which contains more than 4,300,000 sq ft.

At the present time K-F is turning out about 18,000 cars a month. At the end of last year it had assets totaling $95 million. The company has now produced more than 325,000 cars and is the largest independent producer in the industry. It has probably turned out more cars already than 90 pct of the 1500 firms which have attempted to enter the automotive field.

Kaiser-Frazer has been moving swiftly in recent months to consolidate its position in the industry.

Purchase of the Willow Run plant is regarded in Detroit as a master stroke by the company. Other recent moves which have strengthened K-F's prospects for the future include the acquisition of the Phoenix-Apollo steel works and the leasing of a huge parts and accessories warehouse to be built in Chicago.

Having previously nailed down considerable sources of basic pig iron through the acquisition of blast furnaces at Provo, Utah, Struthers, Ohio, and Cleveland, the Phoenixville, Pa. steel facilities have re-enforced K-F's already formidable metal supply line.

Whatever its critics may think, Kaiser-Frazer has sent down a lot of deep roots in the automotive industry. In the battle of procurement—which has been a basic issue in the automobile industry for the past 3 years—K-F has outrun everyone of its competitors without exception. The company is also reported to be in a highly advantageous position with respect to a light, low-priced car, when as and if necessary raw materials are available.

K-F has made no pretense about hiding its ambitions to compete directly with Ford, Chevrolet and Plymouth. Its proposed new car is known to be well beyond the "mock-up" stage. K-F officials have explained, however, that the company's present steel sources are not yet adequate for the new car in addition to its present output of Kaisers and Frazers.

While purchase of Willow Run by K-F came as a surprise to most of the industry, it is unlikely that the company would have relished embarking on a long-range program of volume production on a scale approximating that of the automotive "big three" in a rented plant.

•

Ford's Ore Boats Haul Record Tonnage to Rouge

• • • **Ford Motor Co.'s** ships, Henry Ford II and Benson Ford, have broken all previous tonnage records in hauling ore to the Rouge this year. A total of 1,050,572 gross tons of iron ore have been delivered to the Rouge during the season which started Apr. 16 and closed Nov. 30. The previous record of 836,000 tons was set in 1936. During 1947 the tonnage was 699,344.

It was disclosed that the two Ford vessels also hauled 140,195 net tons of coal and made several trips to other Great Lakes ports with iron ore for other companies.

New Construction Shows Slight Seasonal Decline

Washington

• • • **Although declining** slightly largely because of seasonal factors, November new construction totaled $1.5 billion to bring the amount for the first 11 months of 1948 to about $16.3 billion.

The decline was partially attributed by the Bureau of Labor Statistics to a drop of 8 pct in residential building. For the first time since the end of the war, housing construction has been under the dollar volume of the corresponding month of the year previous.

While total construction of new plants and factories for 1948 is down nearly $300 million over last year, this drop is offset by a more than $400 million increase in construction of stores, offices, warehouses, etc.

Private construction is up 28 pct over last year as contrasted with 30 pct for publicly financed building. Most public financing has gone into institutional work (hospital and educational building being double that last year); public housing expenditures are down 66 pct.

o o o

FRAMED: *But only in the photo. A skilled tool and die maker carefully scrapes bronze insert ends of the lathe's jaws so that the large but delicate part to be worked will not be marred. The large machine is used to turn forgings for parts of large machinery used in automobile manufacture.*

o o o

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Washington . . .

EUGENE J. HARDY

• Labor outlook optimistic . . . Wage increases held to be major inflationary factor . . . Steel houses get boost . . . Aircraft employment rises.

WASHINGTON—The outlook on the labor front, as viewed from Washington, appears to be one of relative quiet. Moderate wage increases and an absence of lengthy strikes are expected to characterize the coming period of new wage contract negotiations.

In general, this is the view of labor experts. Economic and fiscal planners, however, view with alarm any so-called fourth round of wage increases, since it is felt that such boosts, even though they may be moderate compared with the substantial wage increases that have been obtained throughout the post-war period, will again set in motion the inflationary spiral which has been showing signs of leveling off. With all signs pointing toward only a moderate increase in government expenditures next year, it is believed that wage boosts are one of the major sources of inflationary dangers. This view has been stated publicly by Edwin G. Nourse, Chairman of the President's Council of Economic Advisers. It is also known to be held privately by Treasury Secretary John W. Snyder and other fiscal authorities.

The average wage increase anticipated by Capital experts is expected to be not more than a maximum of 8 to 10 cents an hour. Renewed emphasis will be placed on welfare provisions — insurance, pensions—and other fringe issues, according to these sources.

The General Motors contract, which ties wages to the cost-of-living index, is expected to hold down the aspirations of many unions, both in and out of the auto manufacturing industry. The only increase in sight for GM workers at this time is a regular 3-cent an hour improvement boost next spring, since the cost-of-living index is beginning to level off. Should the cost-of-living index decline sufficiently, it is felt that the UAW would accept the decrease in wages called for in the contract and continue living up to this unique agreement.

While, except for the inflationary aspects, the labor outlook is relatively optimistic, Administration leaders fear that John L. Lewis will upset the proverbial applecart if he is successful in obtaining a shorter work week or a substantial boost in wages for the miners. Such a development would not only push up the price of steel and ricochet throughout industry generally, but it would put other union leaders in an embarrassing position in regard to their own wage aspirations.

The tip off to the mine chieftain's probable intentions came at a recent Labor Dept. Conference on State Labor Legislation. During the course of this conference, a UMW district president served notice that the UMW will ask for a 6-hour day, 30-hour week when contract negotiations open next year. He was also successful in keeping the conference from going on record as favoring an 8-hour day, 40-hour week.

* * *

The steel industry can expect to be on the receiving end of a lot of "I-told-you-so" comments from the proponents of all-steel prefab houses as result of the recent contract awarded to the Lustron Corp., by the Navy Dept. for 60 Lustron steel houses.

The Lustron Corp. is slated to receive about 78 pct of a total voluntary allocation of 59,000 tons of sheet steel for the steel housing industry. The allocation was agreed to by the steel industry only after severe pressure had been brought to bear by the Administration. The 59,000 tons is only enough to build about 7600 houses. Should the steel house catch on with the American public, it is quite obvious that a much larger quantity of steel will have to be made available. The program was set up on a 6 month basis, ending Feb. 28, 1949, with approximately 9830 tons of steel to be shipped each month. However, the program did not get underway until October and the Commerce Dept. is expected to ask for a month continuation so that the entire amount will be shipped to the steel house producers. Extension beyond the end of March is not being considered at this time, since it is believed that Congress will enact housing legislation which is almost certain to contain some priority for all types of building materials.

The steel pre-fab industry was given a definite shot in the arm as a result of the Navy contract. While this contract calls for only 60 houses at a cost of $599,379.30 to be erected at Quantico, Virginia, some of the factors surrounding the contract make it especially significant.

In the first place, the steel house was selected over a number of wooden houses. The Lustron bid, according to the Navy, was accepted "on the basis of lowest cost per sq ft of usable area," which implies that it was not actually the lowest bid, dollar-wise.

While not publicly stated, it is known that the low cost of maintenance of porcelain-enameled steel houses was one of the major factors influencing the Navy decision. In addition, it must be remembered that the military services are always looking for items which lend themselves to mass purchasing, in

this case, it is a packaged house.

Another development which has cheered the steel house backers is the report that the Army and Air Force are each subjecting a Lustron house to severe tests in Alaska.

* * *

ROSIE the Riveter and Willie the Welder will have no trouble in getting their old jobs back next year if they want them. Rosie may have a little more trouble than Willie but brighter prospects for aircraft production has lifted the industry from the doldrums; more and more jobs in plane factories are re-opening every day.

Indications are that the overall trend for aircraft workers apparently will continue upward well past the first half of 1949 with the biggest demand showing up about early spring. It would appear, too, that in some areas there is going to be more jobs in highly skilled work than there will be workers to fill them.

These conclusions are drawn from a recent survey conducted by the United States Employment Service. The findings were taken from reports by 54 aircraft manufacturing firms which comprise nearly all the plants engaged primarily in plane manufacturing.

Aircraft employment had reached a low point of 193,000 last June. But as a result of defense planning and new orders coming in, something like 204,000 workers were on the payrolls by the end of August. On the basis of plans reported, it is indicated that such employment would be increased more than 14,000 by the end of December with a grand total of 225,000 by the first of March.

The recall of aircraft workers is expected to follow a tough road in some respects with highly skilled workers harder and harder to find as time goes on — providing high national employment continues, as most think it will. Already some shortages have shown up in specialized jobs such as engine installation, etc.

The immediate and most pressing need seems to be for the building up of a nucleus of experienced and skilled workmen in engineering, retooling, and testing and who are capable of supervising and training others in these types of work as well as in production lines.

Making recruitment of workers more difficult is the fact that the Air Force and the Navy have been employing aircraft workers, particularly aircraft mechanics. These workers have been putting their skill to use in repairing and conditioning of standby planes—but for working purposes the effect is government competition in the same labor market.

* * *

PLANS of the Air Force alone call for adding between 5000 and 10,000 aircraft workers to its employees between last August and next June. Most of this expansion will be concentrated within 10 major locations — Ogden, Rome, Mobile, San Antonio, Middletown (Pa.), Macon, San Bernardino, Sacramento, Oklahoma City, and Dayton.

In most areas to date, little trouble is encountered in obtaining sufficient welders, form block makers, magnetic inspectors, upholsterers, machine operators and power brake operators. Nor does there seem to be a serious shortage of most types of unskilled workmen.

On the other hand, shortage of male labor is being felt in varied skilled occupations in several of the aircraft centers and recruiting is becoming increasingly difficult. These include precision tool grinders, lathe operators, woodworkers, milling machine operators, and engineering lines.

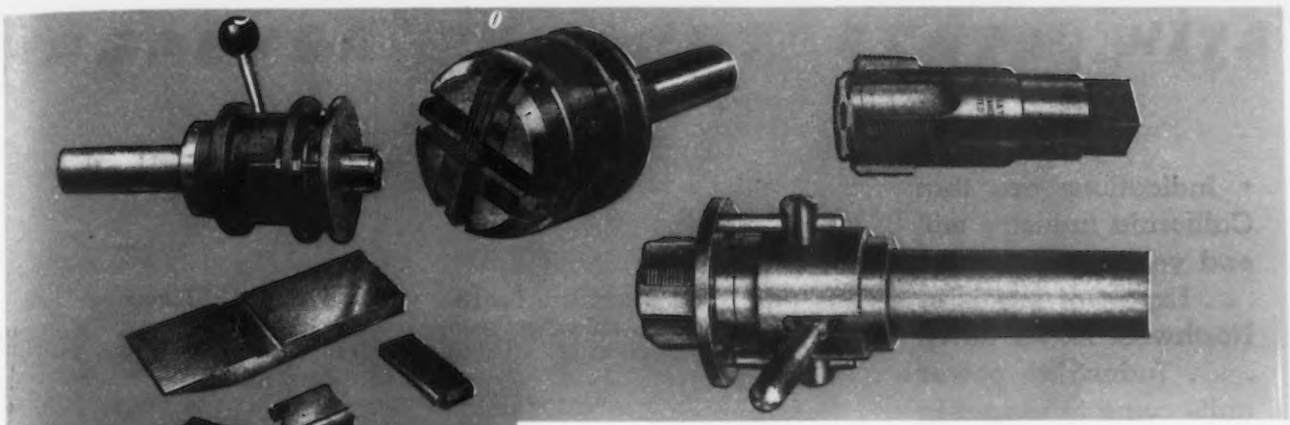
There appears to be two major sources on which the aircraft producers will have to rely for its staffing. One is former employees who have drifted into other industries and the other is the feminine group.

Probably the chief source will be workers in other industries since, for one reason or another, aircraft jobs appear to have an attraction over others. At one time during the war, about 2 million were so employed; those who remained in the labor force after the war were absorbed by other industries

As to the second labor source, during the war employment of females in aircraft production rose as high as 40 pct — about 800,000. Today, the ratio is about 13 pct or 26,000 of the total.

Not even the USES will venture an estimate as to how many of these experienced female craftsmen could be recalled. Many have married and could not and would not return except as a war emergency; those who remained in the labor market have taken white collar positions, jobs which many will not be tempted to leave.

THE BULL OF THE WOODS — BY J. R. WILLIAMS



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West Coast . . .

ROBERT T. REINHARDT

• Indications are that California industry will end year on high note . . . Export of ingots in Northwest slows down . . . Industrial power units come to rescue in Utah.

SAN FRANCISCO — In spite of the costly 3-month waterfront strike, prolonged oil workers strike, a marked reduction in retail store sales and, of course, a steel shortage, California business and industry has an excellent chance to wind up the year on a high level.

This state had more wage and salary workers in manufacturing establishments last October than in any previous peacetime October, although employment during that month this year reached only 767,000 which was 34,000 less than the September figure. Included among the three fourths of all manufacturing industries groups reporting higher employment last October than in the same month last year were: aircraft, with an increase of 6900; and iron and steel with a 6100 increase. There is also a definite trend toward increased employment in the heavy goods industries which reports a 5 pct increase over the same period last year. Iron and steel and their products reports 69,700 workers and nonferrous metals and their products employed 24,900 during that month.

Locally, total employment declined in October because of the recent strikes and seasonal factors. Fabricated metals industries showed increases as did other manufacturing classifications. Unemployment reached an estimated total of 32,600 during the month, which was an increase over the 29,800 reported for September.

One bright spot in five Bay Area counties is found in that for the third quarter of 1948, manufacturing plant workers received in wages $98,733,000 which was almost three times the amount this same classification of workers received in the third quarter of 1940.

Expansion of industry during October in the Bay region and northern California involved 16 projects with an investment of $5,630,200.

This continued industrial growth reflects the almost 50 pct gain in population of this region since 1940 when nine counties around the bay had a population of 1,734,408. The most recent estimate made in July reports 2,597,500 persons. The San Francisco Bay Area Council points out that this means that one out of every three residents of the area came here within the past 8 years. According to forecasts made by Julian C. Riley, statistician for the California Aeronautics Commission, an all-time high of 2,692,800 residents in this nine-county area will be reached in July, 1950.

This skyrocketing growth which has brought the population of the seven western states to approximately 16,135,000 is, of course, one of the important factors in developing the unforeseen heavy demand for steel.

SEATTLE—Export of steel ingots from this area rapidly declined with only 3000 to 4000 tons remaining on contracts with Isaacson Iron Works. One thousand tons are now aboard ship headed for England.

Pacific Car & Foundry Co. has discontinued all shipments of ingots abroad and none are being made for domestic sale at this time. Isaacson is reported as getting an ample supply of scrap although the future is uncertain and they are paying $33 per ton for No. 1 and 2 heavy melting. Ingots are being cast for domestic sale, although overall operation are being reduced to the extent that one furnace is shut down on the second shift to relieve the power load during the peak hours and thus cut steel output 50 pct on that shift.

Pacific Car & Foundry which has been producing approximately 7500 tons of ingots per month this fall, will operate its electric furnace for this purpose only during the third shift so as not to conflict with the peak load period if they go back into this type of production.

Pacific Car reports a slow down in rebuilding of railroad cars. After having repaired or rebuilt 1000 cars this year, the firm will complete its present orders next week and no new contracts for this type of work are in sight. Prospects are reportedly good for additional contracts.

•

General Metals Corp. Spends $1 Million To Mechanize its Foundry

Los Angeles

• • • **In a program** to mechanize its foundry entirely, General Metals Corp. has begun work on a $1,100,000 expansion program which will by July make the company the largest malleable foundry on the Pacific Coast.

"Our fully mechanized automatic machinery will make our foundry the most modern in the country," William A. De Ridder, president, reported to THE IRON AGE.

After completion in mid-summer, General Metals expects to be producing 6000 tons of finished castings annually, according to Mr. De Ridder.

While installing new equipment, the company is continuing operation in its present plant here, replacing equipment almost piece by piece.

New features of the foundry will include continuous pouring, operating from two cupolas and a 10-ton holding furnace. Molds will be

on roller conveyers and there will be automatic sand handling and shakeout equipment.

Although the mechanized pieces are aimed at labor saving, Mr. De Ridder expects them to increase production to a point where actually more men will be employed and raise the labor force to approximately 200.

General Metals, which has been in the Los Angeles area since 1915, also does forging, steel and iron work as well as malleable casting.

Although most foundries in southern California have reported a drop in business, the demand for malleable products has been consistently good, according to Mr. De Ridder.

Most foundrymen regard the general drop-off in the business as seasonal and expect it to pick up after January. This is the first year since before the war, however, when the seasonal drop-off has been noted.

•

Wage Rate Equalization Not Basis for Demands

Salt Lake City

• • • **The strike at** Kennecott Copper's Bingham mine moved into its seventh week without any tangible signs of a settlement. One development during the week which may speed up an agreement was announcement by nonstriking unions that equalization of wage rates for railroad workers inside the pit with rates paid railroad employees outside the pit (the issue which caused the strike) will not be used by their members as a basis for new wage increase demands.

•

Kaiser Expects to Work on New Blast Furnace Soon

Fontana

• • • **Kaiser Steel** is expected to announce shortly the start of work on its new blast furnace and by-products coke plant which will double iron production.

Final hurdles have been cleared with the completion of specifications and approval of the plans by the San Bernardino County Board of Supervisors.

Kaiser's seventh openhearth furnace is expected to be in operation by the end of the month or the start of January.

Plans show the blast furnace, which will handle 1200 tons, and the battery of 45 units in the coke plant will be almost identical to the present furnace and ovens.

In the smog-conscious southern California area, Kaiser Co. Inc., specified in its application to the Board of Supervisors that Eagle Mountain iron ore now used contains less sulfur than most and therefore is less gaseous. Also as protections against contributing to smog were listed self-sealing coke oven doors, coke oven stack, a 300-ft stack at the sintering plant, gas washer, dust collectors, a desulfurizing plant and water settling apparatus.

The additions are being financed privately through a contract for plate for pipe for Transcontinental Oil Co. Consolidated-Western Steel Corp. will fabricate the pipe.

•

Geneva and Kennecott Power Area Lifesaver

Salt Lake City

• • • **Industrial power** generating plants—at Geneva steel plant and Kennecott Copper Corp.'s Bingham mine—are proving to be a lifesaver for this area during a period of record power consumption.

With the power load setting new records every few days, almost a third of the supply is being obtained from the excess generating capacity of the state's two largest industrial operations.

The demand for power is a source of continuing surprises to the Utah Power & Light Co., which has launched an expansion program which a few years ago would have looked utterly fantastic. The peak consumption is usually reached before Christmas, dropping off substantially thereafter until spring. But there is no assurance that the pattern will be followed this year. Last year the load continued to rise in January.

•

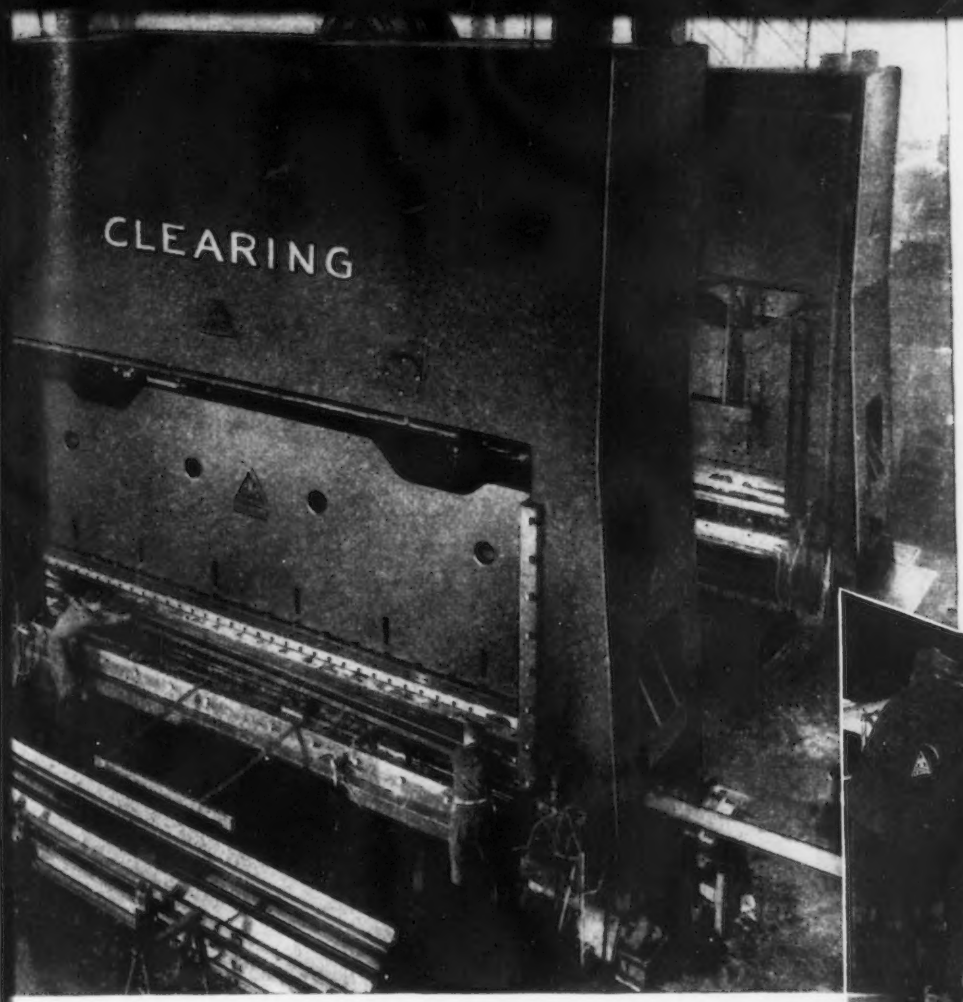
Heads Resources Board

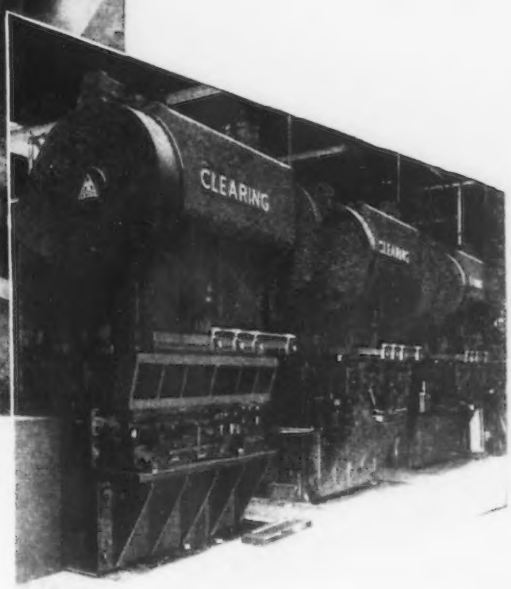
Washington

• • • **John R. Steelman,** assistant to the president, has been named acting chairman of the National Security Resources Board, temporarily succeeding Arthur H. Hill whose resignation became effective Dec. 15.

Steelman will serve in the post until a successor to Mr. Hill is appointed. Hill, who was recently elected a director of International Telephone & Telegraph Corp., will resume his former position as chairman of the executive committee of the Greyhound Corp.

LAUNCHES ROCKETS: *The adjustable rocket launching racks which are capable of launching V-2 type rockets as well as the slightly smaller Aerobee type are shown on the deck of the USS Norton Sound. The* 540 *ft,* 9100-*ton craft is available for use by research agencies of all* 3 *branches of the Armed Services.*





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PERSONALS

ROBERT K. FOLLANSBEE, vice-president in charge of sales, Follansbee Steel Corp.

• **Robert K. Follansbee** has been elected vice-president in charge of sales of the Follansbee Steel Corp., Pittsburgh. Mr. Follansbee had been secretary and treasurer of the corporation. **George W. Ballantine** has been named sales manager of the sheet metal specialty division; **C. F. K. Appel,** acting secretary and treasurer; **William M. Bausch,** sales manager, mill products. **C. G. Carlile,** sales representative, sheet metal specialty division in the state of Ohio.

• **Joseph W. Kelley** has been appointed division sales manager of the special equipment division of the Patterson Foundry & Machine Co., East Liverpool, Ohio. Mr. Kelley formerly served as assistant sales manager of Goslin-Birmingham Co.

• **Harold M. Hess** has been appointed general credit manager of the New Holland Machine Co., New Holland, Pa.

• **James A. Anderson** has been appointed assistant general sales manager of the Babcock & Wilcox Tube Co., Beaver Falls, Pa. Mr. Anderson joined the company in 1941 and has been assistant manager of the New York district sales office since 1944. **William H. Buley** has been made manager of stainless sales. Mr. Buley became associated with Babcock & Wilcox in 1939 and has recently been manager of the general sales office. Both men have their headquarters in Beaver Falls.

o o o

• **Charles E. Agnew** has been named blast furnace superintendent at the Buffalo plant of the Wickwire Spencer Steel division of the Colorado Fuel & Iron Corp. He formerly served in various capacities with Carnegie Illinois Steel Corp. and American Steel & Wire Co.

• **E. L. Martin** and **C. M. March** have been named assistant treasurer and assistant secretary, respectively, Harrisburg Steel Corp., Harrisburg, Pa. J. H. Whitmoyer has been appointed general superintendent.

• **George M. Bryson** has been promoted to supervisor of piecework rating for Bethlehem Pacific Coast Steel Corp., San Francisco. Mr. Bryson has been with this organization since 1935, starting as an inspector and observer in the openhearth department at the Los Angeles plant.

• **George C. Hargrove** and **Ralph D. Waterman** have been elected vice-presidents of E. B. Badger & Sons Co., Boston, a subsidiary of Stone & Webster, Inc. Mr. Hargrove, who has been with the company 18 years, is vice-president in charge of general administration and sales. Mr. Waterman, who joined Badger 9 years ago, is vice-president in charge of engineering.

• **B. H. Sloane** and **C. T. Heins** have been advanced to the positions of production superintendent and assistant production superintendent, respectively, at the Vancouver, Wash., plant of the Aluminum Co. of America.

• **Lemuel B. Hunter** has been appointed manager of the raw materials department of Inland Steel Co., Chicago. **Carl B. Jacobs** has been named to succeed Mr. Hunter as fleet manager. Mr. Hunter joined Inland in 1937. Since 1939, and prior to his new appointment, he served at the Indiana Harbor Works of the company. Mr. Jacobs entered the employ of the company in 1941 and has served in the raw materials department since 1945.

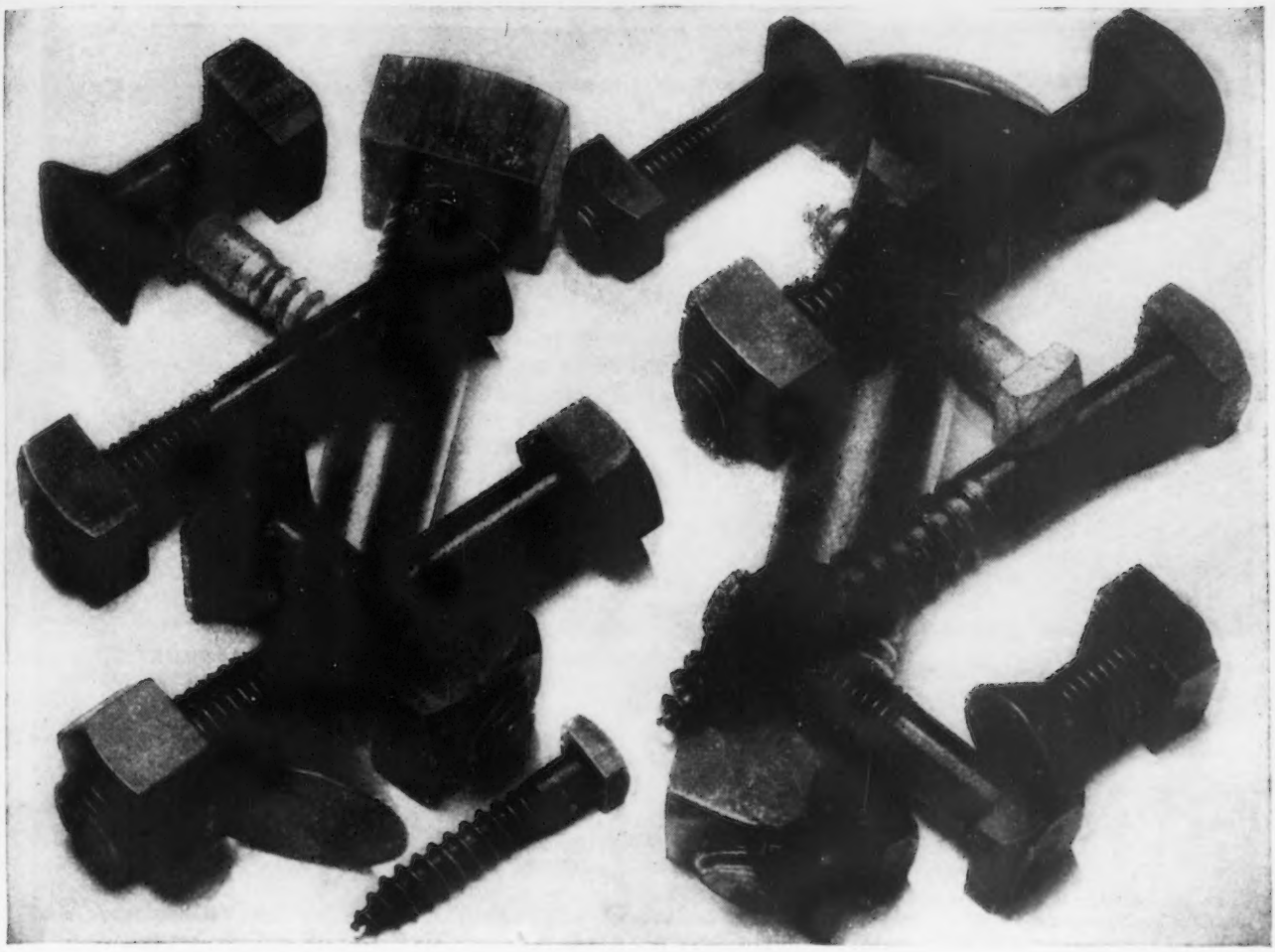
A. S. MARVIN, division engineer in charge of Pittsburgh Engineering Dept., American Bridge Co.

• **A. S. Marvin** has been named division engineer in charge of the engineering department of the American Bridge Co., Pittsburgh, succeeding **F. S. Merrill,** who continues with the company on special engineering assignments. Mr. Marvin joined American Bridge Co. in 1924 at the company's Gary, Ind., plant and later became an engineer in the Chicago division office. In 1947 he was appointed assistant division engineer, which position he held prior to his new appointment.

• **George B. McMeans** has been appointed general superintendent of the Kaiser steel plant, Fontana, Calif., succeeding **C. H. Lenhart,** who recently resigned. Mr. McMeans joined the Kaiser organization in 1947 as assistant general superintendent.

• **W. T. Homan, Jr.,** has been appointed sales engineer for Avon Tube Div., McAleer Mfg. Co., Rochester, Mich., succeeding **R. E. Masters,** who has resigned. Mr. Homan had formerly been connected with the chemical and metallurgical division of Ford Motor Co.

• **Robert C. Artner** has been appointed vice-president and general manager of Midland Steel Products Co., Cleveland. **David S. Greer,** who now serves as treasurer, becomes comptroller as well, and **Howard E. Lemmerman** has been appointed a permanent operating committee member.



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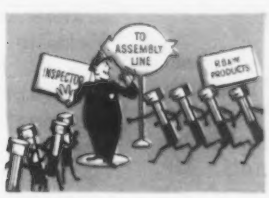

QUALITY CONTROL. Confidence in RB&W's quality control reduces need of plant inspection, and gives the user confidence in satisfactory performance of fasteners.

COMPLETE LINE. In addition to lag screws, machine, plow and carriage bolts (main illustration), RB&W offers a complete line of bolts, nuts, screws, rivets and allied fasteners.

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IS THE LOWEST TOTAL OF ALL
FASTENING COSTS

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

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103 Years Making Strong the Things That Make America Strong

JOHN C. BARNES, vice-president in charge of sales, Eastern Div., Rittling Corp.

• **John C. Barnes** has been appointed vice-president for sales, Eastern Div., the Rittling Corp., Buffalo. Mr. Barnes recently resigned as vice-president for sales, National Radiator Co.

• **D. A. Coulter** has been placed in charge of the new Eastern division sales office in New York, Bingham-Berbrand Corp. of Fremont, Ohio. Mr. Coulter had formerly been vice-president and sales manager of the Penens Corp., a subsidiary of Plomb Tool Co.

• **Henry T. Schlachter** has been appointed representative in southern Ohio and northern Kentucky for Detroit Broach Co., with his headquqarters in Cincinnati. Mr. Schlachter formerly served as mid-western field manager of Cimcool Div., Cincinnati Milling Machine Co.

• **A. W. Wagner** has been appointed general parts division manager of the Thew Shovel Co., Lorain, Ohio. **Cyril Brecknock** has been appointed manager of parts division manufacturing in charge of Plant No. 5; **N. W. Anderson** has been named manager of parts division operations, responsible for parts division planning, production control, warehousing and shipping. **Don Lewis** has been appointed manager of parts division publications and catalog design.

• **Walter A. McGibbony** has been named manager of the Monroe, Mich., plant of the Kelsey-Hayes Wheel Co., Detroit, succeeding **J. C. Hahannah,** who has been transferred to the McKeesport, Pa., plant as manager. **Walter Smith** succeeds Mr. McGibbony as superintendent of the Monroe plant.

• **Henry F. Freiherr** has been named manager of the metal division of National Lead Co.'s Atlantic Branch, succeeding **C. W. Gesregan,** who has retired. Mr. Freiherr has served as manager of the Baltimore Branch since 1938. Mr. Gesregan joined the company in 1902 as a clerk in the Atlantic branch. **Henry Getz** has succeeded Mr. Freiherr as Baltimore branch manager. Mr. Getz has been with the company since 1923.

• **John M. Downie** has been named personnel director of McKinney Mfg. Co., Pittsburgh. Mr. Downie had served as personnel manager of the Richmond Radiator Co., prior to his new appointment.

• **H. Lee Sterry** has been appointed business manager of the International division of the Carrier Corp., Syracuse, with his headquarters in New York.

• **Lionel Tinfow** has been appointed to the industrial sales engineering staff of the New York branch of Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

• **Arthur W. Krause** and **Alvin M. Cunningham** have joined the engineering division of Gas Machinery Co., Cleveland. Mr. Krause had served as research engineer in the laboratories of the American Gas Association. Mr. Cunningham had also been connected with American Gas Association laboratories.

• **Lew C. Conover** has been appointed territorial representative for eastern Pennsylvania, Delaware, Maryland, Washington and South Jersey for Marcus Transformer Co., Inc., Hillside.

• **Jule Leroy** has joined the Loewenthal Metals Corp., Chicago, as buyer and salesman. Mr. Leroy has been associated with the nonferrous industry in Chicago for a number of years.

JONATHAN D. FREEZE, New York district sales manager, Jessop Steel Co.

• **Jonathan D. Freeze** has been appointed district sales manager for the New York territory of Jessop Steel Co., Washington, Pa. Mr. Freeze has his headquqarters in New York. He formerly served U. S. Steel Export Co., the Crucible Steel Co. and the Armco International Corp., the latter in various capacities, here and abroad. Most recently he was Chicago representative for Fritz W. Glitsch & Sons, Inc.

• **Courtnay Pitt** has been elected to the newly-created post of vice-president, finance, Philco Corp., Philadelphia. Dr. Pitt joined Philco in 1941, where he served in positions of increasing responsibility and early in 1947 was appointed economist in charge of the division of Economic Research.

• **A. Gordon Gunther** has been promoted to general factory superintendent, Royal Typewriter Co., Hartford. Mr. Gunther has formerly been assistant superintendent in charge of purchasing. **Alan S. Cook,** formerly assistant factory supervisor, has been named assistant superintendent. **John F. Kloski,** formerly assistant superintendent of engineering, has been made engineering superintendent in charge of all engineering on present and new products. **Frederick W. Barrett,** previously assistant purchasing agent, has been made purchasing agent.

E. V. CRANE, chief engineer, Hydraulic Press Mfg. Co.

• **E. V. Crane** has been appointed chief engineer of the Hydraulic Press Mfg. Co., Mt. Gilead, Ohio. Mr. Crane had formerly been associated with E. W. Bliss Co. as chief development engineer and with Sam Tour & Co., Inc., as vice-president in charge of the mechanical engineering department.

• **William F. Ritchie** has been named sales manager of Rylander Mfg. Co., Detroit. He formerly served with the Kelvinator Corp., Packard Motor Car Co. and the Ranger Engine Div., Fairchild Corp.

• **James W. Fatkin** has been named manager of manufacturing for the Aviation Gas Turbine division of Westinghouse Electric Corp., in Philadelphia. Mr. Fatkin, who has held Westinghouse production posts for the past 33 years, replaces **Samuel S. Stine,** who recently has been named plant manager of the company's new Kansas City works. **Peter A. Roos** has been appointed superintendent of blade and diaphragm manufacturing in Philadelphia, the post previously held by Mr. Fatkin, and **Dewey H. Martz** has been appointed superintendent of assembly and test for the division, also at the Philadelphia plant.

• **James D. Willcox, Jr.,** has been appointed district manager of Elliott Co.'s Houston territory. Mr. Willcox joined Elliott in 1935 and previous to his new appointment served in the Atlanta district office.

• **B. A. Woina,** former chief engineer of Mullins Mfg. Co., has been named director of the sheet metal products development and production engineering division of Designers for Industry, Inc., Cleveland.

• **Charles T. Mentzer, Jr.,** has been appointed sales supervisor of the organic chemicals department in New York of the E. I. du Pont de Nemours & Co., Wilmington, Del.

THOMAS J. LINGLE, Western Div. manager, Taylor Forge & Pipe Works

• **Thomas J. Lingle** has been named western division manager in charge of manufacturing operations of the new Fontana, Calif., plant of Taylor Forge & Pipe Works. Mr. Lingle formerly had been associated with C. F. Braun Co. and since 1946 operated his own business.

• **S. W. Lipton** has formed a buying and selling connection with I. Schumann & Co., Cleveland. Mr. Lipton had formerly been associated with American Metal Co. and Duquesne Smelting Corp.

(CONTINUED ON PAGE 144)

OBITUARY...

• **Andrew H. Loranger,** 57, formerly assistant sales manager, Cleveland district, Republic Steel Corp., died Nov. 24.

• **Frank W. Hamilton,** 62, president, Ulster Iron Works, Dover, N. J., died Dec. 1.

• **George Wilson,** 76, assistant superintendent of Lockhart Iron & Steel Co., Pittsburgh, died Dec. 4.

• **John A. Williams,** 64, foundry superintendent, Dodge Steel Co., Philadelphia, died Dec. 4.

• **William A. Englehart,** salvage engineer, Pontiac Motor Div., General Motors, Pontiac, Mich., died Nov. 29.

• **Louis Kuehn,** 81, founder and former chairman, Milcor Steel Co., Milwaukee, and a director of Inland Steel Co., Chicago, died Nov. 27.

• **William B. Cushing,** retired works accounting supervisor, American Steel & Wire Co., Cleveland, died recently.

• **Lawrence R. Quinn,** 60, vice-president, Enameled Metals Co., Etna, Pa., died Nov. 25.

• **Boyd Dudley, Jr.,** 60, president, E. C. Stearns & Co., Syracuse, died Dec. 2.

• **J. Clark Godfrey,** 57, retired assistant to the vice-president and works manager, Otis Elevator Co., New York, died Nov. 26.

• **Lybrand P. Smith,** 57, professor emeritus of naval engineering, Massachusetts Institute of Technology, died Nov. 25.

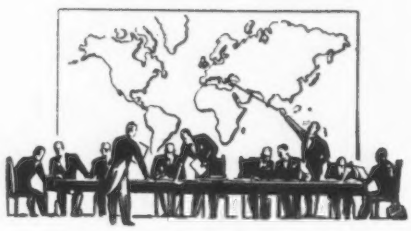
• **Abraham M. Bers,** 78, president, Bers & Co., Philadelphia, died Dec. 2.

• **Lorne A. Scott,** president, L. A. Scott & Co., Ipswich, Mass., died Nov. 24.

• **Alexander A. Rankeilor,** 84, textile machine designer, inventor and formerly superintendent, Saco-Lowell Co., Saco, Me., died Nov. 24.

European Letter . . .

• Western Powers argue over control of German industry . . . France fears revival will jeopardize her national safety . . . Germany could eventually be a dominant force in manipulating balance of power.



LONDON—In recent weeks, the fear has grown in western Europe that in spite of devastation, in spite of occupation, in spite of plans for the level of industry, the German people may yet regain their former dominant position in European affairs.

Anxiety on this score is strongest in France, but the uneasiness is also infecting France's neighbors. It is to some extent the result of the snowballing effect of earlier decisions on Germany. The Americans and the British decided over a year ago to revive German industry and to include western Germany in the Marshall plan. Soon after, the permissible levels of industry were raised. Six months ago the currency was reformed and this gave economic expansion a tremendous fillip. This step was followed by two others: by the announcement that the management of the German coal and steel industries would be handed back to the Germans, pending a final decision, by a future German government, about their ownership; and by an American move to put an end to dismantlement on the grounds that the continued delivery of reparations would impair "the contribution Germany can make to the European Recovery Program." The Humphreys Committee, appointed by Mr. Paul Hoffman, has toured the Ruhr and now proposes that two-thirds of the present (already reduced) list of plants which are to be disposed of as reparations should escape dismantlement and remain in Germany. The cumulation of all these developments—all coming to a head within a few weeks—has been to bring about in Germany an industrial revival which in the crucial category of steel now surpases France's own and to create a new mood of aggressive self-confidence among the Germans.

Unhappily the restoration of some freedom of action to the western Germans has coincided with the steady deepening of tension between the western Powers and Russia—a tension which is inevitably centered on Germany. The Germans are very naturally considering what their role should be in this struggle between east and west, and the Soviet decision to arm the police of the eastern zone has set off in the western zones demands for similar protection and speculations on the "value to the western cause" of a strong rearmed Germany. There has been no trace in the official Anglo-American attitude of any readiness to listen to this talk. On the contrary, the continued disarmament of the western police forces has been reaffirmed. But many Frenchmen, and other western Europeans, argue that, 18 months ago, the control of German industry at a low level was the Allies' gospel. Yet the needs of European recovery have led to a revision of the whole program. May not "the needs of European defense" have the same effect?

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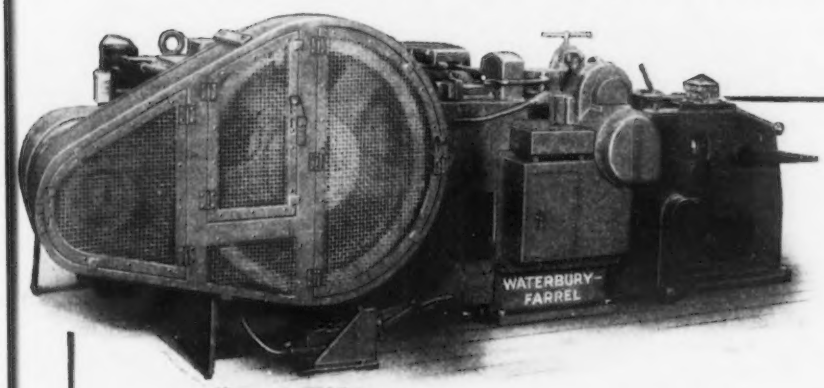
IT is no use dismissing this fear of a resurgent Germany as panic-stricken and unrealistic, on the grounds that western Germany is a heap of ruins where the male population has been decimated into harmlessness. It is not Germany alone that people fear but the use Germany could make of a strong central position to manipulate the European balance of power in its own interests. A western Germany which was strong enough to offer any real increase in security to western Europe would also be strong enough to negotiate with Russia on its own terms. And nothing in Germany's past—neither the Treaty of Rapallo nor the Molotov-Ribbentrop Pact — suggests that German loyalty to western ideals is such that it excludes separate arrangements with the enemies of the west.

The crisis of confidence created by this sudden unfolding of possible vistas of German expansion and strength must be overcome with all speed. It has bred uncertainty and suspicion between the members of the actual Brussels Pact and the potential Atlantic Pact. It is sapping the psychological preconditions of partnership. It is a menace both to the hope of successful western defense and to the European Recovery Program. But how can the atmosphere be improved? Where has the policy gone wrong?

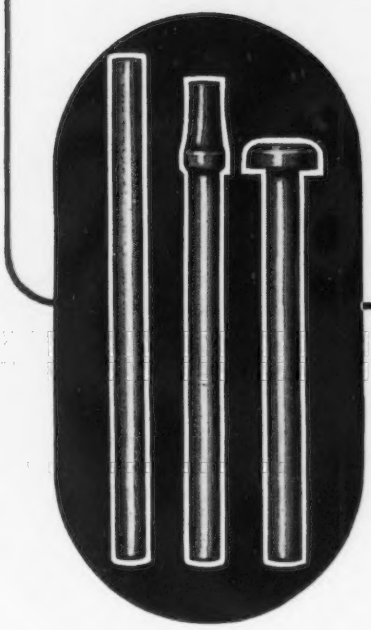
The fundamental dilemma of western policy towards Germany has long been apparent. On the one hand, to impose all manner of restrictions and discriminations on the German people is to run the risk, indeed, the certainty, that they will one day resume Great Power status burning for revenge. On the other hand, after two German aggressions it is impossible to readmit the Germans to an equal place among the nations on the sole guarantee of their promise to be good. But if the dilemma has long been clear, so has the only possible ultimate way out of it—that all the countries of western Europe should themselves submit to the same restraints on their sovereignty as they find it necessary to impose on Germany, which could then be free and prosperous without being dan-

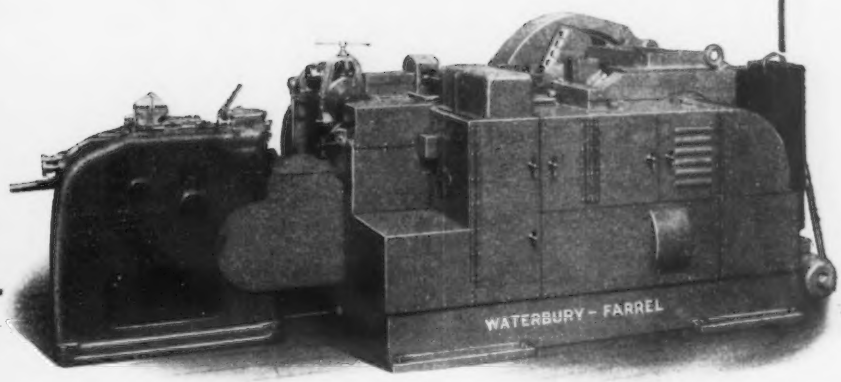
New WATERBURY "HI-PRO" HEADS 150 (¼" × 3") BLANKS PER MINUTE From AJAX-HOGUE Drawn Wire



Waterbury "Hi-Pro" header with AJAX-HOGUE wire drawer attached.

Other side of same header showing AJAX-HOGUE drawer at left.





¼" x 3" blanks drawn and headed on the machines illustrated.

● The New Waterbury-Farrel Hi-Pro solid die, double stroke crank header achieves a new high in fast, uniform cold heading of blanks to 3 inches in length. A most important contributing factor to this exceptional performance is the Ajax-Hogue drawer which provides the header with freshly drawn, clean, straight wire of unvarying accuracy. Ajax-Hogue wire drawers are built in five sizes with capacity from ¼ inch to 1 inch diameter to be used with every make of cold header. Write for bulletin No. 111 for more complete information.

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gerous. It was partly because it pointed in this direction that many Europeans welcomed the Marshall plan. But at the moment one aim of the plan—the quick restoration of prosperity—is being allowed to overshadow another, that western Europe should be sufficiently unified in political matters to prevent German recovery from being a menace to Germany's neighbors. What is needed at the present moment is a clarification and formal restatement of the western Powers' policy for Germany. At present, policy in Germany is coming up for discussion all over the place—in the Humphreys Committee on dimantlement, in the fusion plans for Bizonia, in western Germany's claims put forward to the Organization for Economic Cooperation in Paris, in the Six Power talks on the Ruhr. But the result is not so much a policy as a piece of patchwork that is being pulled and picked in different directions by rival interests and diplomacies. What is needed to end this confusion is a Foreign Ministers' conference of the three major Powers of the west, together with the smaller countries concerned, to pull all these rough ends together into a coherent whole.

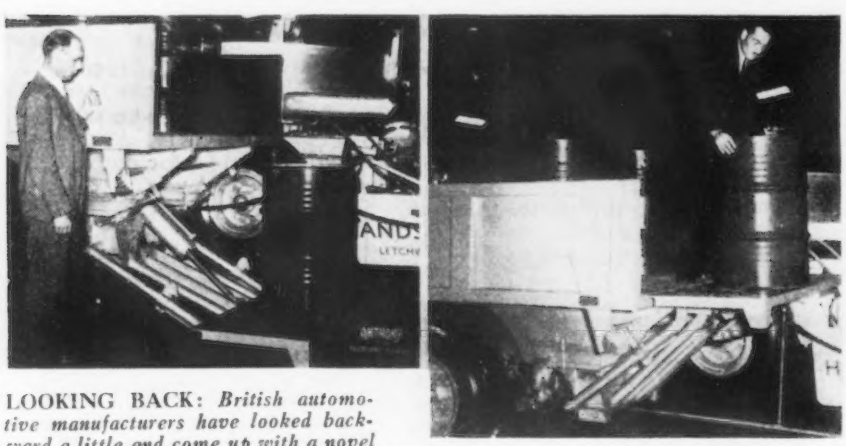
SUCH a clarification requires two things of the British and the Americans. The first is a clear statement that they do not intend to make western Germany a military bulwark and that the offer of a pact of demilitarization put forward by Mr. Byrnes 18 months ago still stands. The second is more speed and inventiveness in securing a settlement for the Ruhr. The only solution which can at once reassure Germany's neighbors and avoid exasperating the Germans' aggrieved nationism is one that extends to the steel industry in western Europe as a whole the forms of control which are to be imposed upon the Germans. A modest first step in the direction of an agreed statute for the Ruhr has been taken in admitting France to the Anglo-American boards of control responsible for German coal and steel in advance of the French zone's fusion with Bizonia. This step gives France an equal voice in the present essentially temporary organs of control and as such has been welcomed by the French Government. But the question of ultimate safeguard, when military occupation has come to an end, will still remain. Only if the international control of the Ruhr does not depend upon external agencies but is inherent in the structure of the steel industry will it last beyond the withdrawal of the Allies. It is agreement on this type of internationization that the Ruhr talks in London should aim to achieve.

A clarification of policy for Germany does not, however, depend simply on British and American action. The attitude of France is crucial. Geographically, politically and militarily there can be no solution of the German problem without France's concurrence, yet grave psychological difficulties still stand in the way of an agreed policy. French opinion itself is divided between those who hardly admit that Germany should revive at all and believe that permanent repression is still possible, and the rival opinion, of which there are strong traces in Gaullist circles, that if only France and Germany could form a firm alliance, Europe could be organized on an anti-Russian basis without the interference of the Anglo-Saxons. And through both extremes runs the crippling strand of profound distrust for France's two chief allies and best — indeed, only — friends, Britain and the United States.

From France, therefore, the present situation also demands two things. The first is to accept a German policy in which a measure of German revival and independence is rendered safe by including the core of the German economy—the Ruhr — in a wider European industrial framework. At present, French policy attempts to obstruct German revival and at the same time to impose external international control on the Ruhr alone. This policy doubly defeats the hope of French security, for on the one hand it ensures a resentful Germany and on the other, proposes a type of control which resurgent German nationalism will sooner or later easily throw off.

FRANCE'S second task is even more urgent. It is to cement the alliance of the western Powers by making an act of faith in its efficacy. So much in France's relations with its allies is riddled with distrust. As a result, the French never reach the point of intimacy and confidence at which ideas can be freely exchanged and difficulties genuinely examined. By remaining in a sense psychologically apart from their British and American friends, the French miss day by day the chance to mold the alliance into a real instrument of security. M. Francois-Poncet, a wise Frenchman whose experience of Germany is unrivalled and who is now advising General Koenig in the French zone, put his finger on the real weakness in the French position when he wrote recently:

"If France artificially isolates itself out of sheer mistrust of itself and of the others, it will be undermining its security at the very moment when there is a general desire to give it a fresh foundation. There is one thing we should have learned from our experience —France only owes its salvation in part to itself. The rest it owes to its foreign friends."



LOOKING BACK: *British automotive manufacturers have looked backward a little and come up with a novel hydraulically-operated tail gate which takes loads up to* 1500 *lb. A lever, shown left, sets the tail gate in motion so that it can be lowered to the ground for loading and unloading. At the right, the tail gate is shown in its normal position.*

MARKET BRIEFS

• **COMING, TIN PLATE BOOST**—Effective Jan. 1, prices of tin mill products will be increased. Carnegie-Illinois Steel Corp. will increase the price of hot dipped tin plate (1.50 lb coating) from $6.80 to $7.75 per 100 lb base box. Electrolytic tin plate, .75 lb coating will sell at $7 per base box, up $16 a ton; .50 lb coating $6.70 per base box, up $14 a ton and .25 lb coating $6.45 per base box, up $13 a ton. This means that deductions from the 1.50 lb coating base box price of $7.75 will be 25c for the 1.25 lb coating; 75c for the .75 lb coating; $1.05 for the .50 lb coating and $1.30 for the .25 lb coating. Can making quality black plate will sell at $5.75 per base box on the 55 to 128 lb coating basis and special coated manufacturing ternes will be $6.65 a base box, up $14 per ton. Other producers have made similar increases.

• **AHA, IT COMES**—November scrap shipments from Germany hit a high, 80,700 tons, according to the Office of Industry Cooperation. This is an increase of almost 30,000 tons over October and brings the yearly imports from Germany to 232,900 tons. Here's how it came in by months: July, 9500 tons; August, 24,700 tons; September, 67,000 tons; October, 51,000 tons and November, 80,000 tons. So, German scrap, domestic scrap from scrap drives and continual increases in scrap generated at the mills can have our scrap supply in good shape in the near future.

• **ASK CONTROLS**—Commerce Secretary Sawyer has asked for renewal of export and other controls over scarce materials. According to him, "the national interest is being importantly served by these controls and they should be continued." It is believed that he will also recommend standby powers to ration scarce materials to industry. Such powers would be used in the event that voluntary allocation of steel and other scarce materials bogs down.

• **MOVING ALONG**—Ingot output in the United States for November ran 7,763,216 net tons and brought the 11 month total to 80,737,800 tons, according to the American Iron and Steel Institute. The November figure is only 223,896 tons short of the October all time monthly record.

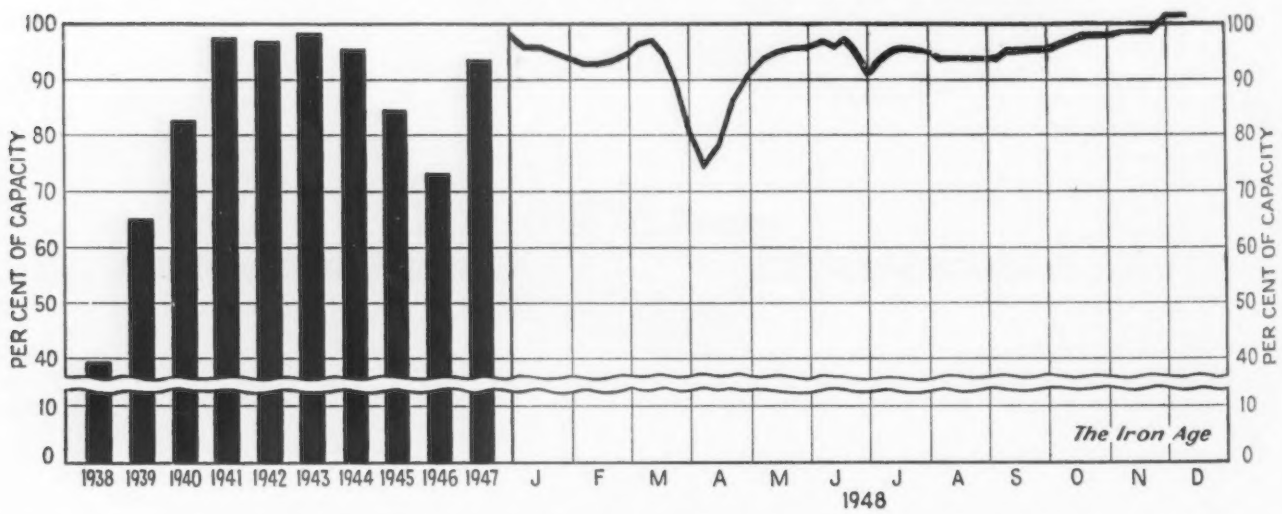
• **A BIG BUNDLE**—The iron and steel industry's monthly payroll exceeded $200 million for the first time in its history during October, according to the American Iron and Steel Institute. The actual figure was $201,608,000 or $2,228,000 more than the September figure. Estimated employment was 644,100 which is only 400 less than the August, 1948 peak. This means that the average hourly earnings for the month were $1.699, 1.9c less than in September, but 11.5c higher than in October of 1947.

• **A DIFFERENT STORY**—For a while it looked as if Borg-Warner was going to buy the Copperweld Steel Co.'s Warren, Ohio, plant. In fact, negotiations went so far as to have informed sources set a date for consummation of the sale. But something went haywire. Now Borg-Warner states flatly that "discussions with Copperweld have been inconclusive and have been terminated." Incidentally, this deal has been bounced around for quite some time heretofore.

• **BRANCHING OUT**—Inland Steel Co. has approved plans for enlarging its overall facilities for making tin mill products, according to Wilfred Sykes, president of the company. Present ingot capacity which is 3.4 million tons a year will be increased from 15 to 20 pct while capacity for making tin plate and other tin plate products will be jumped from 4 million boxes per year which is now being made to approximately 6 million boxes. Other expansion includes enlarging cold rolled sheet facilities, installation of a new battery of coke ovens and construction of a new ore freighter.

• **SCRAP DRIVE PLANS**—A committee of more than 70 trade association representatives recently appointed by Secretary of Commerce Charles Sawyer, has called on industry for a winter housecleaning campaign to cough up obsolete equipment as a source of scrap supply. The Advertising Council and Steel Products Advisory Committee have agreed to participate. It has been estimated that nearly 3 million tons of steel production was lost this year through scrap shortage. All guns possible are being trained on steel production of 92 million tons for next year.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
Dec. 7	98.0*	100.0*	94.0	98.0	103.5	105.0	103.5	99.0	105.0*	106.0	107.0	89.5	102.0	100.5
Dec. 14	100.0	99.0	94.0	98.0	100.0	105.0	100.5	103.0	102.0	104.5	107.0	91.5	98.0	100.5

* Revised.

Industrial News Summary

- **Steel Outdoing Itself in Output**
- **This May Answer Capacity Critics**
- **Extreme Shortages to End in 1949**

SOME congressmen, getting ready to sharp shoot at the steel industry on the controversial capacity question, will find their ammunition no better than a Christmas pop gun. And when they get going it may be no more than political pap.

Joe Doakes will be uninterested at this time in supporting an all out argument on "Is there enough capacity?" He can find stoves, washers, dryers, ironers, sweepers, gadgets, radios, hardware and many other items he thought he needed. To the man on the street the only shortage is low priced autos—and it might not be too long before he will get a chance to get those.

The steel industry's artillery is impressive. So much has output been boosted that capacity figures are a secondary problem. Steel is not pouring out of anyone's ears but more is being made than ever before in history. This rate will keep up during the first 6 months of 1949. And then if there are no serious labor troubles it will keep right on pouring into the pipelines.

But there is no sign of a falling off in steel production. Nor is there any chance that supply will outrun demand for at least the first half of next year. After that it is anyone's guess. But before guesses are in order such things as labor impasse, defense demand, European arms and the effects of a fourth round of wages will have to be gaged. It is not yet time to sell steel short or to decide that the tight metals condition is ready for the rummage sale department.

Regular steel production and sales are in the running for some time to come. Demand from the oil industry, from gas pipeline firms and from the auto field will be heavy most of next year. A dark horse in the present steel picture is governmental and state sponsored construction.

This may mushroom if reports of unemployment become widespread. Layoffs have occurred in the metal industry but they are so small a part of total working force that they are only a sign to watch at this time.

IF reports of unemployment are exaggerated for any reason whatever in the next many months the result will not be happy for business. Such reports will feed requests for government spending on a large scale — which would mean more taxes. Or more pounding away at private business.

There are definite signs this week that the gray market in steel has weakened—both in tonnages being offered and in price. But it has not been knocked out. As long as there is a chance of higher steel prices those using steel will be wary of getting too low on inventories. Nor will they tell steel companies to cut their quotas.

Yet the chance that 1949 will bring out a new record in finished steel output—because of new finished steel capacities and full output of openhearths—means the highly pressurized steel shortage phase will come to an end next year. It also means that by the end of 1949 this country can well take care of any preparedness program or a war—but not a combination of shiny doodads and armament.

No user of conversion steel, outside of some appliance makers, is doing away with this high priced method of getting what he wants. Nor is there any chance that he will in the near future. Next year may be a different story. Steel is still hard to get for many buyers. The bigger ones still need scads of tonnage that they cannot get through their regular mill sources.

THE extreme steel shortage boogy man is bound to die a quiet death in 1949. Steel firms have increased and will continue to increase, their steelmaking capacities. This will be done by (1) building more electric furnaces. (2) rebuilding and increasing output of older furnaces, (3) building more openhearths, (4) increasing use of blown metal from bessemer converters and (5) higher capacity on existing units because of better performance.

Increased steel output next year on existing capacity will be due to (1) more and better coal for coke output, (2) big increase in steelmaking pig iron production, (3) completion of major repair programs and (4) refinements in uses of oxygen in iron and steelmaking.

Steel output this week stays at 100.5 pct. The usual shutdown because of Christmas may not be as complete this year as in previous years. Many firms will shut down that weekend but as many more are expected to keep the steelmaking furnaces going at full tilt.

Cast scrap prices were weaker this week in most markets. Some of the slipping in quotations—which averaged around $1 a ton—was due to (1) better pig iron output, (2) less demand from jobbing foundries and (3) better supplies at larger foundries.

SERVING YOU by doing things with air

Is your finishing department PROFITABLE *or do you pour profits into your finishing department?*

In the face of today's rapidly mounting manufacturing costs it's pretty important to find out. Analysis by a DeVilbiss engineer will indicate whether the adoption of a few improved spray practices will solve the bugaboo of spiraling costs, or whether new, more efficient equipment might be advisable.

DeVilbiss spray systems can effect time, labor and material savings that will put your finishing department on a profitable basis. The unsurpassed speed and efficiency of these systems save valuable manhours, cut costs, help you produce for less—sell for less. And the beautiful, durable finishes on your products applied by DeVilbiss spray guns, represent a mark of quality that will appeal to your customers eye—compel them to buy.

Pioneer in its field, continuously devoted to improving spray methods and equipment through years of experience, DeVilbiss is today's leading authority on "how to spray it best at lowest cost". When you want such information and the equipment that will do your job best—call DeVilbiss.

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Canadian Plant: WINDSOR, ONTARIO

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means **Quality** *in all four . .*

SPRAY EQUIPMENT
EXHAUST SYSTEMS
AIR COMPRESSORS
HOSE & CONNECTIONS

Administration Poised to Wield Axe or Broom on Steel Industry

But Bureaucratic Straight-Jacket for Business in 1949 Seen Unlikely

o o o

By GEORGE BAKER
Washington Bureau

o o o

Washington

• • • **Any way you** look at it, 1949 is going to be a big year in Washington for the metalworking industries.

As far as the steel industry is concerned, you can bet your bottom dollar that President Truman and the new Congress are getting ready to roll up their sleeves, spit on their hands, and go to work.

The working-over may be done with (a) an axe, (b) a broom, (c) both.

There is a growing feeling of self-rightousness in the Administration and in the new Congress that license for an axe-or broom-wielding treatment was granted in the November elections. These forces are attempting to exploit to the fullest the "mandate from the people" argument.

The axe treatment, for example, will be felt in new and stronger proposals for government construction and operation of new steel mills. The broom-sweeping will include plenty of yammering —and possible action—on such subjects as profits and monopolistic trends.

But industry isn't going to be forced into a bureaucratic straitjacket in 1949. Neither will it escape the imposition of new restraints and controls by the Federal Government. The developments of the new year actually will fall somewhere between the two extremes.

Here's a look ahead at some of the roadblocks now being set in position on Capitol Hill, in the White House, and in the departments and agencies:

Price Controls—Whether or not President Truman proposes them, they will find a minority number of strong supporters in Congress. Debate will be noisy, but final enactment into law in doubt because of sharply divided opinion within Democratic ranks on this hot potato.

Compulsory Allocation of Steel —Look for a real battle over this one. Mr. Truman twice within the past year has demanded power to parcel out the limited supplies of steel and other scarce commodities. He'll ask for the power again next month, and may get it. Main question is how Congress will temper such power before turning it over to him. A number of key congressmen think he'll get (a) an extension of the voluntary control program (b) authority to invoke controls if the voluntary program bogs down (standby controls). But a huge arms budget could upset this and force a quick return to priorities and rationing set-up. One thing is certain, however: The President's authority to invoke standby controls would be used as a club to force the steel producers into fuller participation in the voluntary control program. Some steel producers and a number of steel customers are telling the Commerce Dept. that the only difference between compulsory and voluntary controls would be

Naw — You Do It!

one of labels, if voluntary controls become industrywide. And many producers would gladly turn over to Washington the thankless job of slicing the pie.

Government Operation of New Mills—Senator Murray, D., Mont., has been quietly recruiting Administration support for his perennial proposal that the Federal Government build and operate new capacity if the industry is "unwilling to expand." Mr. Murray's idea of "expansion" is an immediate start on 10 million tons of basic ingot capacity. Assistant Secretary of the Interior C. Girard Davidson has now joined hands with the railway brotherhoods and the CIO in support of the Murray proposal. Chances are that nothing short of war or a huge arms budget could force enactment of such a program in 1949.

Price Cooling-Off Period—Senator O'Mahoney, D., Wyo., is behind this one. His idea is that 60 to 90 days should elapse between announcement of price rises in steel and other basic commodities and the effective periods of the proposed hikes. Public hearings would be held during this cooling-off period with both sides presenting testimony. Idea was hotter a month ago, just before cost-of-living prices began to level off.

Excess Profits Tax—Almost certainly will be proposed by White House, but Southern conservatives on Senate Finance Committee and House Ways and Means Committee probably will side with Republicans in voting against such a proposal. An increase in corporate taxes is a better bet.

Accelerated Depreciation — A fiscal proposal that may get somewhere. Substantial numbers of both Democrats and Republicans are back of the idea to speed up amortization on plant and equipment. Unofficially, the Bureau of Internal Revenue is inclined to go along with the idea, but hasn't said so yet. Lengthy public hearings, probably in late Spring, are now being planned by congressional committees.

Delivered Prices—Present signs point to amicable settlement between Federal Trade Commission and Senator Capehart's Trade Policies Subcommittee. Such a settlement would include a left-handed endorsement of freight absorption requested by buyer. But any such agreement eventually would have to be backed by legislation or Supreme Court decision, so the fundamental issue remains to be resolved. Eventual Congressional action is likely.

Senator O'Mahoney, new deal stalwart, has already stated in his opinion congress should act on this problem, and added that he thought such action would be taken.

Antitrust Suits—Number of new suits filed probably will reach a new peak within the next few months, then will taper off slightly. Many will be filed against steel and other basic industries as part of the Administration's fight against high prices of cost-of-living items. No lessening of Attorney General Clark's 1948 efforts; voting of requested appropriations by Democratic Congress will mean renewal of trust-busting vigor in Justice Dept. and in FTC.

Antitrust Legislation — Despite threats of Representative Patman, D., Texas, and others, the possible enactment of O'Mahoney-Kefauver antimonopoly bill is probably as far as Congress will go in this field. Bill, which has been pending for 20 years, would block acquisition of competitors' assets. Acquisition of competitors' stock already is prohibited by Clayton Act.

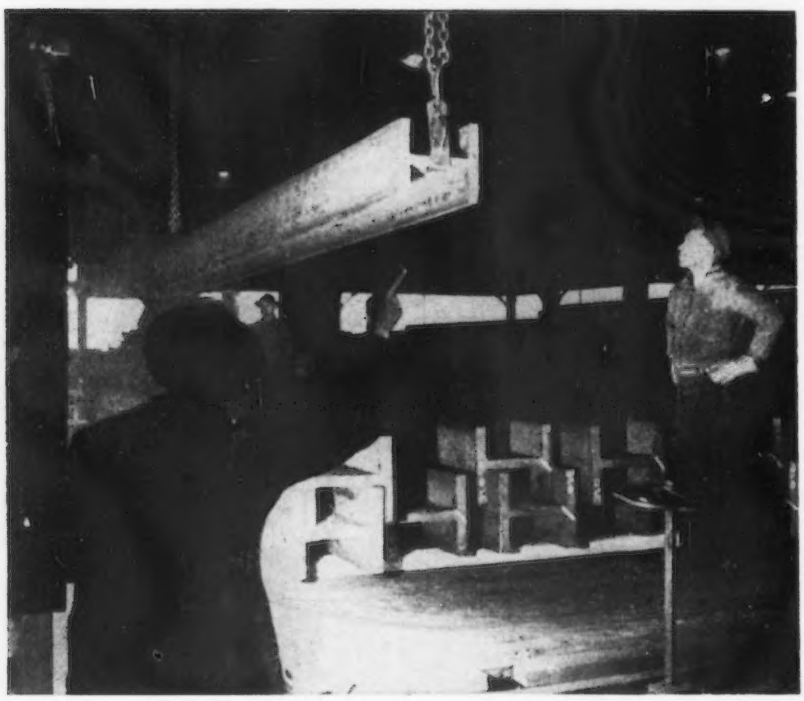
Labor Legislation—Paste this in your hat: The Taft-Hartley Act will be repealed. But a closer look will show that the repealing act will be directed primarily against the label. Labor-minded congressmen say that "the curse will be removed when the tag comes off." Actually, a number of Taft-Hartley prohibitions, such as those against jurisdictional strikes and secondary boycotts, probably will be carried over and included in a new labor-management act, which will resemble the Wagner Act in part.

In summary, business and industry face an interesting year in the nation's capital. When Mr. Truman was asked earlier this month to comment on Representative Rayburn's statement that "business had nothing to fear" for the next 2 years, it may be significant that the newly-elected President did not give a direct answer.

His reply was, "Has business had anything to fear in the past 3½ years?"

You can write your own answer to that one.

BACKBONE: *Here 14-in. beams for the United Nations Secretariet building in New York are shown being loaded in cars at the Homestead works of Carnegie, Illinois. Each of these beams weighs 5 tons, and together they will form the backbone of the new structure.*



South Africa Seen as Best Source for Strategic Manganese Ores

New York

• • • **There's one thing** the land of plenty hasn't got, and that's manganese ores. Now it's not so bad when you don't need something. But manganese ores are just about as important to the steel industry as blast furnaces. No blast furnaces, no pig iron; and similarly, no manganese, what steel!

This year the steel industry is going to turn out about 88,450,000 tons of ingots. To do this and maintain the quality of steel we have developed over a period of years, our melters will have to add about 600,000 tons of metallic manganese in the steelmaking process. With metallurgical ores running 35 to 40 pct manganese, it will take some 1.5 million tons of high grade ore to keep them tapping.

We'll have just about that much available. But here's where the rub comes in. And here's the reason for all the hysteria in government and steel circles. We'll produce about 127,000 tons of ore this year. The other 1.3 million tons will be imported. And Russia will be the chief source, contributing about 450,000 tons or roughly 30 pct of the total.

The United States hasn't been too cooperative with Russia. We shut off machine tool and other strategic material shipments. So far she hasn't retaliated. But she could and the big question is, when?

In the meantime we have some men who aren't waiting around to find out when. They are now at work finding out where we can get that additional supply when and if we need it.

Right now it appears that the Union of South Africa is our best bet. Bernard S. Van Rensselaer, general industrial negotiator of the Office of Industry Cooperation, claims that South Africa could supply about 50 pct of our demand. This year almost 20 pct of our imports will come from there. They have large reserves already developed. But there's a hitch here. Their transportation system is inadequate. They need 4000 ore cars or bogie wagons as they call them to transport the ore from the mines to tidewater.

Union Needs 4000 Ore Cars to Supply Estimated 50 pct of U. S. Consumption

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By STEVE SMOKE
Associate Editor

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The Canadian Car & Foundry Co. has contracted to build the cars and the Canadian government has agreed to allocate steel for 2000 of them. The United States has been asked to allocate 2576 tons monthly for the other 2000 cars. Decision on this allocation is subject to public hearings by the OIC and the Dept. of Commerce. Since little objection has been encountered, approval is expected within weeks.

Only dissent registered so far has come from the House Small Business Committee. Hobart Cooper asserted that the committee felt more attention should be devoted to development of domestic facilities for the production of manganese and other strategic materials.

This is fine. But we don't have what it takes. Our reserves are inadequate. Right now we are getting the biggest part of our domestic ore from the Anaconda and Philipsburg districts in Montana. We also get small amounts from Arizona, Arkansas and Tennessee. It all adds up to less than 10 pct of demand and reliable sources point out that it just isn't here.

The Bureau of Mines considers the Gold Coast our next best possibility. About 30 pct of their exports here are battery grade ores. But they have big reserves and substantial increase in import tonnages from there would entail less rigamarole by far than similar increases from either India or Brazil. And both of the latter have tremendous potential.

India will supply us with 300,000 tons this year, or a little better than 20 pct of our needs. The ore is high grade. But rail transportation, inaccessibility and other drawbacks have authorities writing her off at that figure and expecting little more in the near future.

That just about closes the books on everyone else but Brazil. Based on geological surveys, she boasts reserves in excess of 40 million tons. They assay highly, about 58 pct manganese. But they are located in the rugged and inaccessible northwest Ampa territory. And just like other things, oil in particular, outside interests have to spend a lot of money developing

United States Imports of Manganese Ore

(First 9 months of 1948)

COUNTRY	BATTERY GRADE		METALLURGICAL GRADE		TOTAL	
	Net Tons	Manganese Content	Net Tons	Manganese Content	Net Tons	Manganese Content
Angola	136	55	1,630	880	1,766	935
Belgian Congo	1,008	514	.....	.....	1,008	514
British East Africa	.....	.....	530	281	530	281
Brazil	.....	.....	130,974	58,321	130,974	58,321
Canada	.....	.....	68	30	68	30
Chile	.....	.....	7,490	3,627	7,490	3,627
Cuba	684	355	24,967	11,800	25,651	12,155
French Morocco	.....	.....	300	166	300	166
Gold Coast	46,368	26,370	117,650	57,983	164,018	84,353
India	280	138	235,465	114,773	235,745	114,911
Mexico	.....	.....	32,602	14,482	32,602	14,482
Pakistan	.....	.....	855	424	855	424
Philippines, Rep. of	560	302	6,272	3,087	6,832	3,389
Union of South Africa	.....	.....	218,725	100,583	218,725	100,583
U. S. S. R.	6,318	3,474	280,959	133,206	287,277	136,680
Total	55,354	31,208	1,058,487	499,643	1,113,841	530,851

Industrial Briefs . . .

• CENTENNIAL — Whitman & Barnes, division of United Drill & Tool Corp., Detroit, makers of fine tools, is celebrating their one hundredth anniversary this year.

• BUYS SHEET MILL—All outstanding capital shares of the Whitney Steel Corp., Indianapolis, sheet rolling mills have been purchased by Royal Industrial Corp., New York, from interests associated with David E. Bright and Arnold H. Maremont of Chicago. Jennis M. Doroshaw, Royal's president, will also be president of Whitney Steel but no other personnel change will take place.

• OPENING SALES OFFICE—Weirton Steel Co. will establish a sales office in the Paul Brown Bldg. in St. Louis, Jan. 1, following expiration of an agreement with the E. R. Hensel Co. which has represented Weirton in the St. Louis area for many years.

• CHANGES NAME — Richards Machine Tool Co. has announced their change in name to Rimat Machine Tool Co. They have also moved their plant and offices to larger quarters at 1117 Air Way, Glendale, Calif.

• SOUTHERN WAREHOUSE—Chain Belt Co. of Milwaukee has announced the opening of a new Atlanta warehouse and district office at 878 Ashby St., N. W. G. J. Schuelke will supervise the new warehouse.

• EXPANDING—Allegheny Ludlum Steel Corp. will spend $100,000 to expand and improve its Buffalo alloy foundry. Included in the improvements are two induction furnaces, a new X-ray laboratory and $10,000 worth of new equipment.

• MERGER—A consolidation has been effected between the Johnson Matthey Co. and P. R. Mallory & Co., Inc., Indianapolis, manufacturers of metallurgical and electronic products. The new company will be known as Johnson Matthey & Mallory Ltd. and will be located at 110 Industry St., Toronto.

• WILL HEAD ACS—Dr. Ernest H. Volwiler, executive vice-president of Abbott Laboratories, North Chicago, Ill., has been chosen president-elect of the American Chemical Society. He will head the society in 1950.

• NEW COMPANY—Charles A. Marshall, formerly of Chicago, has opened offices at 30 Church St., New York, to engage in the purchase and sale of surplus, obsolete and scrap railway equipment and parts.

• WEST COAST—Hammond Machinery Builders, Inc. of Kalamazoo, Mich., has opened a new office at 1021 East 8th St., Los Angeles, to better serve the West Coast metal finishing industry.

• MAGNETIC SCREWDRIVERS — The Magna Tools Corp. has been organized by four executives of the Eastman Machine Co. of Buffalo to manufacture a magnetic screw-holding device used in power screwdriving operations and also a magnetic screwdriver for general use. The products will be made in the Eastman plant.

• BEARINGS AGENT—The Bearing Engineering & Sales Co., Salt Lake City, has been appointed distributor of antifriction bearings by the Torrington Co., Torrington, Conn., for Utah, Nevada, southern Idaho and southwest Wyoming.

projects, beat their brains out doing it and then hold their breaths while they see whether or not they can get their goods out of the country.

Brazil is really a big question mark. She's got vast resources of both high grade iron and manganese ores. Probably more big executives take pleasure trips on business to Brazil than to any other country. But most of them have the same experience Ben Fairless, president of U. S. Steel Corp., had on his recent trip there. Mr. Fairless stated that U. S. Steel was not interested in building railroads in Brazil. He was, no doubt, more interested in what they carry—iron and manganese ores.

The need for trade relations between the two countries is as ripe as berries for plucking. Each has something the other needs badly. But it is definite that Brazil will have to develop some of her own mines and build some of her own railroads before she will have berries to sell.

In the meantime we are over the barrel. That is why we search so diligently for manganese ores and a practical place to get them. If Russia decides to stop shipments tomorrow, it will take more than potential to keep openhearths going.

Manganese is a strategic material. Stockpiling for an emergency has been in progress for several years now. We have made headway—until this year. Some people don't like allocations, voluntary or otherwise. But steel for the Canadian ore car program is a certainty, competent observers say. If so, we can't get the cars to South Africa too soon to start somewhere near 600,000 tons of high grade ore moving into our furnaces or stockpiles each year.

Constructing New Plant

Buffalo

• • • **The Master** Builders Co. of Cleveland, processor of chemical borings, has started construction of a 20,000 sq ft plant on a site here recently acquired from the Erie Railroad. The cost is estimated at over $200,000 and completion is scheduled by June 1st. The Buffalo Crane Co. is the general contractor.

Oliver Mining Co.'s Busiest Season Ends With All-Time Record

Duluth, Minn.

• • • **Oliver Iron** Mining Co. has closed the 1948 season with an all-time record of 36,526,000 tons of iron ore, the greatest peace-time mark in its 56-year history, according to R. T. Elstad, president of this United States Steel subsidiary. Just four weeks ago the mining official announced Oliver's all-time production record of 3,002,000 tons of iron ore concentrates.

The company's high level of mining activity parallels the record output from the nation's steel mills. The current season's mining operations ended when freezing weather conditions made further lake shipping inadvisable.

During the 1948 season, Oliver operated a total of 25 mines. These are located between Coleraine and Biwabik on the Mesabi range, at Ely and Soudan on the Vermilion range, all in Minnesota; and at Ironwood, Michigan, on the Gogebic range. Included in the total of ore-producing mines are seven underground properties.

The Company began its 1948 season by tackling the greatest stripping program in its history, Mr. Elstad continued. Stripping operations remove surface dirt and rock overburden from underlying ore bodies in preparation for forthcoming mining operations.

As the season progressed, Oliver opened its new Sherman mine near the City of Fraser and made the first ore shipment from this mine in August. Development work and mining likewise continued at the nearby Monroe mine and later plans were announced for a $3,500,000 improvement program to include maintenance shops and employee buildings at both the Sherman and Monroe mines.

In its program to conserve direct shipping ores, Oliver late last year began construction of a new iron ore beneficiating plant at Mountain Iron, Minnesota, to further utilize its low grade reserves. Along with its big Trout Lake Concentrator, this new plant, placed in operation last summer, assisted Oliver to set its all-time production record for iron ore concentrates.

On the eastern Mesabi range, dewatering operations were started at the Gilbert mine near that range community to bring this mine into production next year. First shipments will also be made from the new Fraser underground mine near the City of Fraser, where development work has been going on for several years.

During the coming winter, Oliver's miners will be engaged in a heavy program of equipment repair work and stripping operations, thereby stabilizing employment during the winter months.

A program for the removal of 28 million yd of dirt and rock in order to get mines ready for next year's production is now under way. Among the properties where large scale stripping programs will be carried on during the coming year are: Gilbert mine; the Canton, near Biwabik; Spruce at Eveleth; Rouchleau at Virginia; Mountain Iron; the Hartley-Sherman-Fraser group near the City of Fraser; Monroe at Chisholm; Hull-Rust at Hibbing; the Gross-Marble at Marble, and Walker at Coleraine.

GM Closing One Foundry

Buffalo

• • • **General Motors Corp.** reports its Central Foundry Div. foundry at Lockport will be closed "as soon as possible," because of a reduction in demand for gray iron castings in this area. More than 250 workers will be affected.

"The backlog of orders for household appliances accumulated during the war now has been filled and manufacture of these products will continue on a basis to meet current needs," said James H. Smith, general manager of the foundry division.

Most of the employees will be offered jobs in other Central Foundry Div. plants in the Midwest or possibly with the Harrison Radiator Div. at Lockport.

Casting work for the Harrison Radiator plants will be done by nearby jobbing foundries.

Odenbach Gets WAA Barge Building Facility

Washington

• • • **The Odenbach** Shipbuilding Corp. has purchased Plancor 1543, a surplus wartime barge-building facility at Greece, N. Y., for $250,000, War Assets Administration has announced.

The property consists of approximately 117 acres of land, containing a main building, machine shop, service building, yard office and office building, with a total capacity of about 200,000 sq ft of space. Odenbach operated the plant during the war under a lease from the Defense Plant Corp. for the construction of tankers, barges and other small craft.

The sale is subject to the provisions of the National Security Clause.

DIFFERENT SMOKE: *Smoke emerges from the barrel of this 16-in. coastal gun at Fort Funston, San Francisco. But it is not from gunpowder. Here workmen use torches to cut one of several guns, that the Army has declared obsolete, into sections for scrap. The Army stated that it takes two days to cut up one of these guns.*

Ploeser Charges ERP Promotes Monopoly; Hurts Small Business

Washington

• • • **The House** Small Business Committee is considering charges that not only is the European aid program "tending to promote monopoly," but that it is having otherwise harmful effects upon small business.

This charge was made this week by Chairman Walter C. Ploeser, R., Mo. He asked the committee to recommend in a forthcoming report that the Justice Dept. study the "condition of monopoly which is evident with respect to certain commodities."

"While it is recognized that the Economic Cooperation Administration does no actual procuring," he stated, "certinly it has the power to establish regulations controlling the channeling of foreign aid business. It has the authority now to refuse funds for any contemplated purchase."

Using cotton as an example, Mr. Ploeser said that during the month of August one firm (out of 67) got more than 71 pct of all orders. He added that during the same month, it was indicated that 229 firms got all the remainder of foreign aid business under ECA.

"This illustration regarding cotton seems typical of many other items on the program such as farm equipment, heavy machinery, and others," Mr. Ploeser said.

"If any comparable situation should arise in our domestic economy, the Dept. of Justice would undoubtedly conduct an investigation for violation of antitrust laws."

For the first 8 bonths of operation, ECA approved authorizations involving nearly $4 billion. Actual shipments of orders run to slightly more than 25 pct of authorizations, many of which are for 1949 delivery.

Other statements made to the House committee for inclusion in the forthcoming annual report are that ECA export of critically-short materials is having particularly harmful effect on small business and that such exports are contributing materially to inflation and high costs of living.

AMERICAN IRON AND STEEL INSTITUTE
SHIPMENTS OF STEEL PRODUCTS
ALL GRADES INCLUDING ALLOY AND STAINLESS
(Net Tons)

OCTOBER - 1948
Month

Steel Products	Number of companies	Items	Current Month: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Current Month: Per cent of Total Shipments	Current Month: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	To Date This Year: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	To Date This Year: Per cent of Total Shipments	To Date This Year: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Whole Year 1947: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Whole Year 1947: Per cent of Total Shipments	Whole Year 1947: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc	45	1	286,420	4.8	287,128	*2,572,256	4.8	2,721,013	2,966,748	4.7	2,396,343
Structural shapes (heavy)	12	2	391,889	6.6	1,958	3,493,341	6.5	20,981	4,436,129	7.0	2,640
Steel piling	4	3	25,848	0.4	120	245,967	0.5	1,324	324,224	0.5	23
Plates (sheared and universal)	29	4	641,351	10.8	33,595	5,712,951	10.6	310,125	6,345,216	10.1	219,227
Skelp	6	5	6,453	0.1	58,226	* 59,710	0.1	* 435,124	160,989	0.3	384,004
Rails—Standard (over 60 lbs.)	4	6	173,433	2.9	1,395	1,630,296	3.0	10,736	2,207,146	3.5	991
—All other	5	7	16,867	0.3	48	181,339	0.3	991	211,900	0.3	329
Joint bars	7	8	11,137	0.2	3,488	113,747	0.2	34,397	173,923	0.3	15,198
Tie plates	7	9	38,207	0.6	1	408,549	0.8	338	504,779	0.8	4,437
Track spikes	8	10	13,359	0.2	15	119,193	0.2	573	163,746	0.3	146
Hot Rolled Bars—Carbon	34	11	534,788	9.0	57,424	*5,105,520	9.4	512,141	6,242,416	9.9	745,770
—Reinforcing—New billet	16	12	121,752	2.0	822	*1,108,448	2.1	5,702	1,277,075	2.0	9,775
—Rerolled	13	13	20,836	0.4	-	178,286	0.3	-	175,833	0.3	-
—Alloy	27	14	178,229	3.0	17,510	1,575,011	2.9	186,754	1,741,432	2.8	212,382
—Total	44	15	855,605	14.4	75,756	7,967,265	14.7	704,597	9,436,756	15.0	967,927
Cold Finished Bars—Carbon	28	16	128,105	2.2	761	1,105,719	2.0	5,517	1,426,701	2.3	9,249
—Alloy	27	17	23,671	0.4	649	* 193,373	0.4	6,050	218,802	0.3	2,601
—Total	35	18	151,776	2.6	1,410	*1,299,092	2.4	11,567	1,645,503	2.6	11,850
Tool steel bars	18	19	7,982	0.1	90	72,808	0.1	1,411	87,279	0.1	1,670
Pipe & Tubes—Butt weld	16	20	183,840	3.1	2,159	1,659,575	3.1	23,070	1,892,691	3.0	78,080
—Lap weld	8	21	32,054	0.5	-	283,637	0.5	3	389,762	0.6	875
—Electric weld	13	22	154,239	2.6	570	1,297,965	2.4	4,408	1,254,325	2.0	4,274
—Seamless	17	23	267,690	4.5	12,741	2,389,457	4.4	140,073	2,581,106	4.1	157,208
Wire rods	21	24	54,647	0.9	21,645	504,161	0.9	252,995	667,282	1.1	331,192
Wire—Drawn	39	25	240,734	4.1	14,645	2,202,765	4.1	146,667	2,590,963	4.1	181,783
—Nails and staples	17	26	77,116	1.3	1,195	715,934	1.3	10,867	799,436	1.3	8,481
—Barbed and twisted	15	27	20,567	0.3	26	210,391	0.4	426	256,991	0.4	128
—Woven wire fence	13	28	33,188	0.6	269	331,519	0.6	3,100	407,295	0.6	3,616
—Bale ties	11	29	9,400	0.2	-	99,351	0.2	-	119,917	0.2	-
Black Plate—Ordinary	9	30	75,861	1.3	-	671,416	1.2	654	801,745	1.3	2,033
—Chemically treated	2	31	1,879	-	-	12,442	-	-	19,252	-	-
Tin and Terne Plate—Hot dipped	9	32	192,329	3.2	-	1,775,722	3.3	259	2,093,149	3.3	228
—Electrolytic	9	33	157,747	2.7	-	1,461,608	2.7	215	1,617,659	2.6	529
Sheets—Hot rolled	32	34	690,775	11.6	57,909	6,411,939	11.8	528,824	7,891,798	12.5	578,426
—Cold rolled	16	35	627,584	10.5	1,496	5,630,180	10.4	16,874	5,504,578	8.7	28,498
—Galvanized	16	36	144,438	2.4	283	1,360,723	2.5	2,419	1,609,881	2.5	889
Strip—Hot rolled	23	37	153,775	2.6	39,493	1,374,285	2.5	307,601	1,740,085	2.7	308,655
—Cold rolled	34	38	161,000	2.7	2,089	1,462,076	2.7	20,535	1,613,005	2.6	28,030
Wheels (car, rolled steel)	5	39	33,267	0.6	65	276,655	0.5	946	356,873	0.6	2
Axles	5	40	19,551	0.3	2	174,800	0.3	118	185,019	0.3	53
All other	-	41	-	-	-	-	-	-	-	-	-
TOTAL STEEL PRODUCTS	140	42	5,952,008	100.0	617,817	*5,183,115	100.0	*5,713,231	63,057,150	100.0	5,717,765

During 1947 the companies included above represented 99.5 % of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Adjusted.

Warehouses Now Operating on Lowest Inventories Since the War

Most Aren't Worried About Future Competition for Business From Mills

o o o

By BILL LLOYD

Cleveland Regional Editor

o o o

Cleveland

• • • **Steel warehouses,** mirror of steel demand and short order segment of steel distribution, are operating on lower inventories today than at any time since the end of World War II.

On the other hand, warehouses, by their own admission, which is supported by statistics, are getting more steel today than ever before.

The reason for this anomaly is probably the product spread. Warehouses are getting more tonnage in products in less demand and less tonnage in products of more demand—on a yearly basis.

Mill shipments to warehouses this year are running slightly ahead of 1947, when jobbers, dealers and distributors of steel received 10,484,000 tons of steel products, a tonnage approximately 57 pct larger than they received in 1940, and 14 pct greater than they received in 1941 and 13 pct greater than they received in 1946. These same jobbers, dealers and distributors received 17 pct of the total steel shipments last year, compared with 15 pct in 1941 and 15 pct in 1940, according to the American Iron and Steel Institute.

But figures to the contrary, reputable warehouse operators report their inventories 25 pct under the level of last year at this time. Sheets, galvanized sheets and plates, structurals, are scarcer than Communists at a Congressional hearing.

For the past 3 or 4 months, many major warehouses have been operating on a very low inventory, and during this period products that were only relatively tight have become very tight. Floor plates, alloy, and cold finished bars and going on allocation in some cases, and warehouse operators are faced with a 50 pct reduction for the first quarter of 1949 as a result. One warehouse in this area reported mill receipts from all suppliers of only 20 tons of heavy gage hot rolled during the past 2 months. During this same period, cold rolled has been spotty and the entire product spread, from an inventory angle, worse than it was 6 months ago.

The first quarter outlook for warehouses is definitely not good. Stocks are depleted, and under the quota system replacement prospects are grim. Even if the reduction lasts only through January, the pinch will be on. In general, warehouses report that prospects for bar shipments look best, but plates and sheets are terrible.

According to some warehouse operators, mills' receipts have been only 60 to 70 pct of their requirement for the past 6 months. "It's pretty hard to explain to a customer why you can't ship him 500 lb or two tons of steel," one operator added.

Thus, warehouses are in approximately the same position, with regard to their customers, as the mills. Demand simply continues to exceed supply.

A few warehouses reported that fewer inquiries have been placed within the past 2 weeks. Others believe they can "smell" a slight let-up in demand, but overall sales volume remains the same.

Lower inquiries in December is not a seasonal trend in the warehouse business, but recent lay-offs in the home appliance business have prompted the suspicion that a small change in demand might be in order.

In general, warehouse operators are aware of the problems con-

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STREET LIGHTER: *The housing for the electronic eye which can see dawn or dusk approaching and turn on individual lights is slipped into place on a model demonstration street light by Art Bjontegard, GE street lighting engineer, at the company's River Works, Lynn, Mass.*

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fronting mills, but the question has been posed, by more than one operator, if mills are not putting the tonnage where business will be the most desirable later on.

For their part, mills report no major change in steel distribution. A number of major producers have reduced bookings to get out from under backlog, and as a result of the allocation program, notices of reductions in various product shipments were sent warehouses and other customers Nov. 1.

One mill spokesman agreed that warehouse operators were right in taking a grim view of first quarter shipments, but emphasized that this does not indicate any fundamental change in steel distribution policy.

The allocation program began last summer. At that time mills were tied up for 60 days in advance. Therefore, tonnage allocated in July was booked third quarter and had to be put in the first open month, which happened to be October with many mills. This concentrated the allocation program in the period October-February, instead of the period of July-February. Thus the pinch.

The statement has been made by some warehouse operators that by July, 1949, there will be a tapering off in demand for some steel products. Mills, generally, are inclined to disagree with this statement.

In any event, when the steel business begins to level off, and some appraisal of the postwar norm can be made, some operators believe that the warehouse spread will eventually be adjusted to a figure near the mill price, and warehouses must develop an organization to compete with mill delivery on the bigger orders.

In the meantime, they're not worrying about mill competition in the future, nor the normal warehouse business. The legitimate warehouses have done, on the whole, a rather excellent job in handling their customers, shuffling stock and in general operating in a demand situation that far exceeded the balmiest notions of anybody in the steel business.

When the day comes that mills are again interested in smaller orders, warehouses believe they can meet the challenge for a number of reasons. Among them are past customer relationships, localized authority, and largely autonomous operation. Mills are probably too big to operate in a market of the normal warehouse limitations.

In a remote but possible future period of low demand, warehouses and mills will make the competition rugged. At present, warehouses are having to carry their own inventories and not take orders for steel they do not have in stock, as in the past, and get immediate shipment from mills. Competition for the warehouse business will change this action on the part of mills, very likely, when the time comes.

Some warehouse operators welcome the day when competition returns, both between the mills and among themselves, and believe, as far as the mills are concerned, that service will be the key to success against mill competition for the bigger orders. These operators are inclined to discount even the opening of mill warehouses, adding that such warehouses in the past have frequently lacked local authority, thus the ability to move quickly.

Some major producers disavow any intention of entering the warehouse business, but it is more than likely that mills, in general, will open warehouses in the future. Mills' prices are pretty well established, but warehouse prices can be adjusted to the freights in so-called dislocated areas. This will apply to mill depots, mill storage houses, etc., as well.

Eventually, the Pittsburgh mills will ship down the river for the river town trade and probably take care of a belt 100 miles wide on each side. Already Pittsburgh mills can deliver Hamilton, Ohio, for example, cheaper than some local producers. Therefore, the mill warehouse expansion, if and when it comes, may be either in dislocated areas, or in other areas where the normal warehouse operations would not be economically feasible.

Scrap Men Elect Officers

New York

• • • **Henry T. Luria,** of Luria Steel & Trading Corp., was elected President of the New York Chapter of the Institute of Scrap Iron & Steel for the year 1949 at a chapter meeting held here recently. Richard D. Schwartz, of Benjamin Schwartz Company, was elected secretary, and Bertram D. Moskowitz, of Schiavone-Bonomo Corp., was elected treasurer.

Other officers elected include the following: First vice-president, Milton Levenson, Miles Metal Corp.; second vice-president, Arthur Chiappari, Bronx Iron & Metals Corp.; chairman of Executive Committee, Joseph A. Moskowitz, Samuel Sons Iron & Steel Co.

Other members of the Executive Committee include the following: Harris Feistal, Charles Dreifus Co.; William Frost, P. W. Bowers & Co., Inc.; Lou Zinader, Luria Bros. & Co., Inc.; Al Vaccaro, V. Vaccaro & Sons, Inc.; William Elman; Fred Seligmann, Jakob & Seligmann; Milton Weinstein, Steel Scrap, Inc.; John Langan, Continental Iron & Steel Co.; Abe Starr, Michael Flynn, Inc.; Charles J. King, Charles J. King, Inc.

Coming Events

1949

Jan. 10-14 Society of Automotive Engineers, annual meeting, Detroit.

Jan. 10-14 Material Handling Institute and American Society of Mechanical Engineers, Materials Handling Show, Philadelphia.

Jan. 14 Malleable Founders' Society, semiannual meeting, Cleveland.

Jan. 24-25 Industrial Furnace Manufacturers Assn., mid-winter meeting, Cleveland.

Jan. 24-28 American Society of Heating & Ventilating Engineers, annual meeting, Chicago.

Feb. 9-10 Steel Founders Society of America, annual meeting, Chicago.

Feb. 14-17 American Institute of Mining & Metallurgical Engineers, annual meeting, San Francisco.

Feb. 28-Mar. 4 American Society for Testing Materials, spring meeting, Chicago.

Mar. 8-10 Society of Automotive Engineers, passenger car, body and production meeting, Detroit.

Big Steel Goes on Record Favoring Legalized Freight Absorption

Sentiments Are Expressed In Letters to Capehart Trade Policies Committee

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Washington

• • • **Big steel** last week went on record as favoring congressional action to legalize freight absorption to permit meeting of competition in any and all markets.

In letters to Senator Capehart, chairman of the Trade Policies Committee, top officials of U. S. Steel, Bethlehem, Republic, and National dispelled rumors to the effect that important segments of the steel industry were satisfied with F.O.B. mill selling.

It is significant, perhaps, that in none of the replies did the term "basing point" or "basing point system" appear, although all were agreed that legalized freight absorption was necessary to proper competitive relationships.

Specifically, the committee asked the heads of the companies if they would "adopt the practice of absorbing freight on sales to distant customers, in order to make delivered prices to these customers competitive with the delivered prices of steel mills located closer to those customers," if permitted by Congress to do so.

David F. Austin, vice president U. S. Steel, replied with an emphatic "Yes," and added that "such practice will be adopted immediately upon being permitted by law to do so."

"In the interest of sound marketing principles, we should be free to meet competitive conditions wherever they exist. If permitted to do so, we undoubtedly would absorb freight to the extent necessary to meet competition on desirable business where the cost is not prohibitive," was the reply of A. B. Homer, president, Bethlehem Steel Co.

C. M. White, president, Republic Steel Corp., advised the committee that "if the right to absorb freight is restored by legislation, we will in the future avail ourselves of it on steel business offered by steel purchasers whose plants are located closer to our competitors when we feel that we can profitably do so."

"We are very much opposed to the present method of selling and assure you that as soon as we are allowed legally to return to the practice of meeting competition in any part of the United States by absorbing freight—which was our practice up until the recent change—we will do so immediately," declared E. T Weir, chairman, National Steel Corp.

Mr. Austin, however, took issue with the statement in the letter from Senator Capehart which referred to "substantially increased revenue" accruing to the steel companies as a result of the switch to F.O.B. mill selling. The U. S. Steel executive stated that it was unrealistic to say that 75 cents per ton average reduction in mill net returns experienced under the previous policy of freight absorption can now be calculated as a gain in revenue as a result of F.O.B. selling. He further pointed out that F.O.B. selling on the part of U. S. Steel's suppliers has increased production costs about 10 cents per ton."

On this point, Mr. Weir expressed a slightly different view. He admitted that "while it is true that the steel industry has had some increased revenue as a result of the switch to F.O.B. mill pricing, nevertheless I consider this only a temporary benefit and was not brought about through any desire on the part of the steel producers," but as a result of the cement decision.

Elaborating on the effect of the switch to F.O.B. mill on U. S. Steel, Mr. Austin further stated that "the change to mill pricing occurred prior to our general price increase in steel products made in July, 1948. The new prices embraced a restoration of the average price reduction of about $1.25 a ton made by these subsidiaries last April, and in addition included an average increase of approximately $8.09 a ton. Since the change in selling method took place prior to the increase and since any possible advantage which might have been derived from the change in selling method had already occurred and was so small in relation to the increase, it cannot fairly be said that the change has resulted in any substantially increased revenue.

"In this connection it was anticipated, and ample evidence is at hand, that companies from which we purchase goods would likewise change their selling methods, which in turn would result in increasing our costs. To date, this has occurred to the extent of about 10 cents per ton.

"**Further,** the more distant the customer is from our plant in relation to a competitor's mill the more he now pays in relation to what he paid before. In some instances, these more distant customers pay several dollars a ton more for steel than they would pay under our prior method of selling. Unless our present selling method is changed, we will become noncompetitive with respect to

Road To Peace?

Washington

• • • A new road leading to possible settlement of the delivered price issue is being explored this week. William Simon, counsel for Senator Capehart's Trade Policies Subcommittee, and Robert B. Dawkins, legal adviser to the Federal Trade Commission, are discussing whether or not the present confusion over geographic pricing practices can be ended without legislation.

Senator Capehart, in announcing Mr. Simon's appointment, said the two representatives "will endeavor to determine the points of agreement and the points of disagreement with a view to working out a clarification of the problem." Mr. Dawkins, according to FTC, "has been intimately associated with systems of delivered prices." Any agreement reached by the two representatives would then be subject to approval of FTC and the Senate subcommittee.

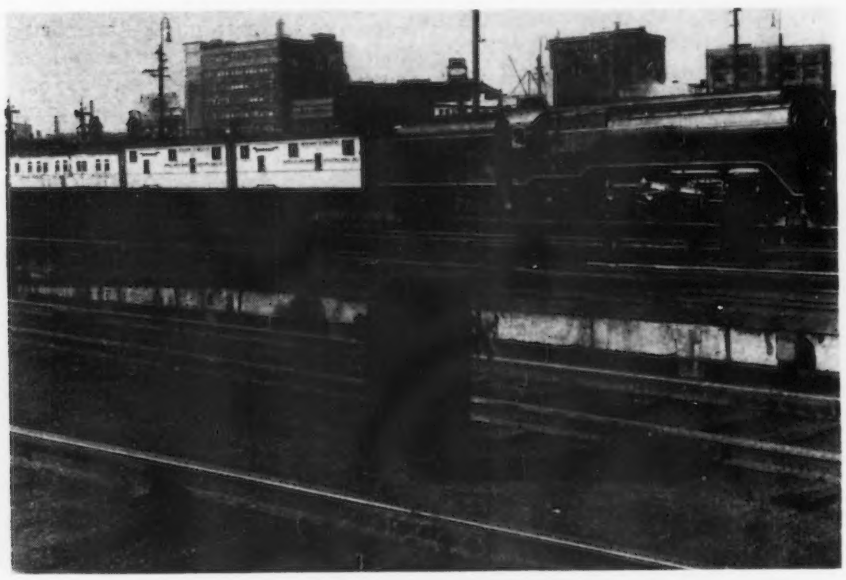
these customers as soon as supply and demand for steel are in balance. Consequently, any apparent advantage to us under present conditions would not only be lost, but be changed into a serious disadvantage in many instances through our loss of the more distant customer's purchases.

"Instead, therefore, of deriving an advantage from this change in our selling method, we deplore the necessity for the change and consider it a serious disadvantage to ourselves and our customers."

Meanwhile, Senator Capehart concluded open hearings on the delivered price issue with testimony from Corwin D. Edwards, director of FTC's Bureau of Industrial Economics. Mr. Edwards told the Trade Policies Subcommittee that "there is an ample basis for the commission to distinguish between competitive and collusive pricing patterns."

"Innocent competitors who meet competition need not fear that they will be subjected to proceedings for conspiracy because of identities in their prices. Change in the law is not necessary for their protection," he added.

Among the witnesses presenting views of the subcommittee during the final week of hearings were J. H. Parmelee and W. J. Kelly, both of the Assn. of American Railroads; H. W. Fraser, Order of Railway Conductors; Roland V. Rodman, Anderson-Pritchard Oil Corp.; H. E. Milton, Milton Oil Co.; Harold H. Moss, Small Business Advisory Committee for the Federal Trade Commission; Fred A. Virkus, Conference of American Small Business Organizations; Hubert H. Leer, Independent Biscuit Co.; Kenneth L. Burnely, Fred W. Albrecht Grocery Co.; Max L. Rysdon, Sioux Steel Co.; C. S. Jones, Farmers' Cooperative Exchange, Inc.; Vernon A. Mund, University of Washington, and Mr. Edwards.



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MOBILE COLLEGE: *Australia takes technical instruction in automotive mechanics to the country student on this mobile college. Below is shown one of the shops in which lathes, electrical gear testers, drills, planers, etc., are arranged along the sides of the car.*

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Willys-Overland Getting WAA Property at Toledo

Washington

• • • **Willys-Overland** Motors, Inc., has purchased two surplus, government-owned wartime manufacturing facilities at Toledo, Ohio, for $861,881.50, War Assets Administration has announced.

One of the properties (Plancor 883), consists of a 4-story building, located on a site of 6½ acres, containing 467,000 sq ft of floor space. The other is a 3-story building, known as the Toledo Core Plant, situated on a plot of 3½ acres and containing 350,000 sq ft of floor space.

Willys-Overland states that it will use the properties for the manufacture of motor vehicles. During the war the properties were operated by Willys-Overland to fulfill government contracts.

The disposal is subject to an opinion by the Dept. of Justice that it does not violate the antitrust laws of the United States.

Opens Research Building

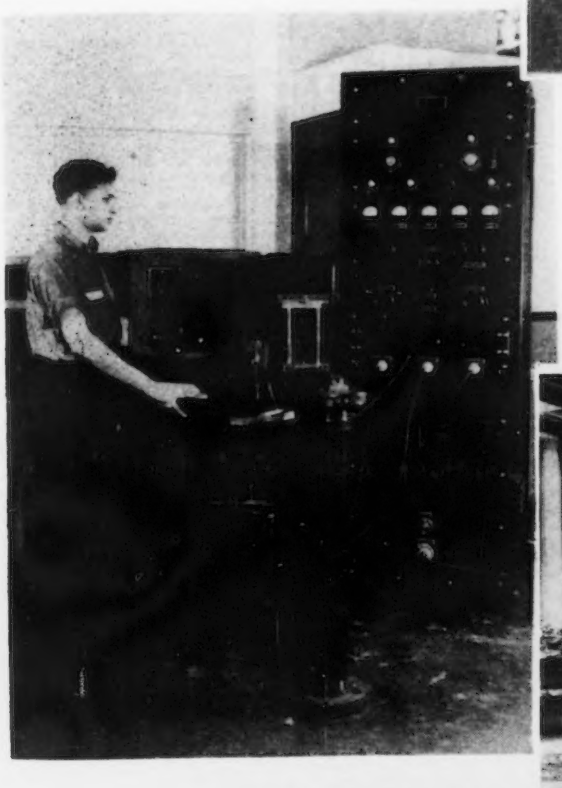
Cleveland

• • • **Eaton** Manufacturing Co. has opened a new general research building located at 4160 Mayfield Road, Cleveland, in which all new product activities of the company will be centered, according to an announcement by J. O. Eaton, chairman of the board. Howard J. Findley will be in charge, under the direction of Martin P. Winther, vice-president and director of engineering.

In the near future the patent department of the company, now located in Detroit, will be transferred and will make its headquarters in the same building under the direction of C. B. McDonald.

The building has 20,000 sq ft floor space and cost $300,000.

Carpenter Builds New Lab to Speed Up Development of New and Better Steels

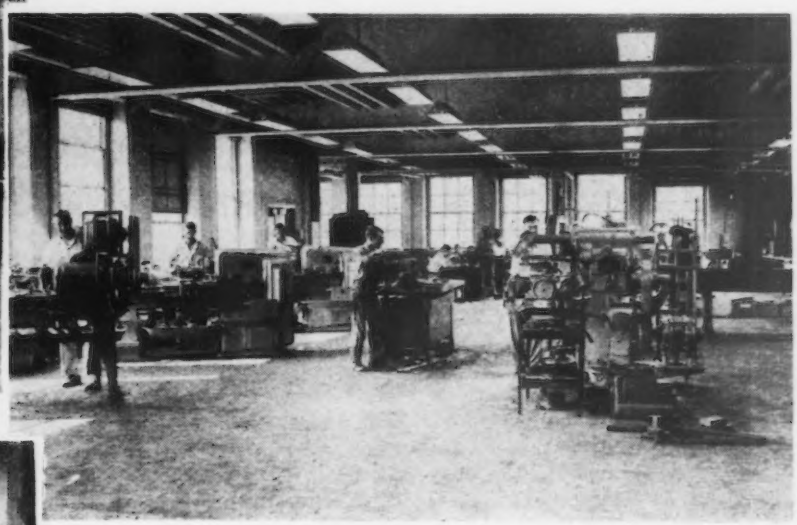


LEFT

A new spectrograph is used to detect and determine quickly the percentage of various elements in alloy steels.

BELOW

To cut down testing time, a complete machine shop right in the lab prepares specimens on which a wide variety of tests are made.



LEFT

The Sylvania dilatometer measures and records, in one millionth of an inch, the expansion and contraction of low expansion alloys.

BELOW

Specially designed benches equipped with conveniently arranged gas, air and water outlets cut down time needed for making chemical analyses.

Construction Steel . . .

• • • Fabricated steel awards this week included the following:

5560 Tons, Dunkirk, N. Y. Buffalo Niagara Electric Corp., power plant through Stone & Webster Engineering Corp., general contractors, to Bethlehem Steel Co., Inc., Bethlehem.

1590 Tons, Camden, S. C., fiber plant, E. I. duPont de Nemours Co., to Bethlehem Steel Co., Inc., Bethlehem.

700 Tons, Kitsap Co., Wash., approaches, Port Washington Narrows bridge, through MacRae Bros., to Pacific Car & Foundry Co., Renton, Wash.

600 Tons, Fox Lake, Minn., power station for the Interstate Power Co. to Vierling Steel Works, Chicago.

555 Tons, Buffalo, bridge for Pennsylvania R.R., through Metzger Construction Corp., Buffalo, general contractor to Bethlehem Steel Co., Inc., Bethlehem.

465 Tons, Madison Co., Ill., state highway bridge section 202-F to Bethlehem Steel Co., Inc., Bethlehem.

270 Tons, Ardmore, Pa., addition to store, Strawbridge & Clothier Co., to Bethlehem Steel Co., Inc., Bethlehem.

255 Tons, Kittitas Co., Wash., Cle Elum River bridge, through M. P. Butler to Poole-McGonigle Co.

250 Tons, Lynbrook, L. I., telephone building, Remsen & Washington Ave., to Grand Iron Works, Inc., New York.

250 Tons, Elizabethton, Tenn., plant extension for American Bemberg Corp., to Southern Steel Works Co., Birmingham.

150 Tons, Middleton, Mass., Essex Co. Nurses Home through Rich Bros. Construction Co. to Groisser & Shlager, Somerville.

150 Tons, Cordele, Ga., sales and service building for Strickland Motor Co., to Southern Steel Works Co., Birmingham.

135 Tons, Cincinnati, service building for Cincinnati Gas & Electric Co., through Day & Zimmerman, Philadelphia, to Bethlehem Steel Co., Inc., Bethlehem.

125 Tons, Cicero, Ill., St. Francis of Rome school to Duffin Iron Works, Chicago.

• • • Fabricated steel inquiries this week included the following:

1000 Tons, Philadelphia, addition to General Electric Co. plant, Dec. 21.

400 Tons, Beloit, Wis., high school building.

380 Tons, White Co., Ill., state highway bridge section 4-2F.

300 Tons, South Boston, Mass., housing project through John Bowen, Inc.

150 Tons, Philadelphia, junior high school at 58th and Walnut Sts., due Dec. 23.

• • • Reinforcing bar awards this week included the following:

820 Tons, Denver, highway construction, Highways 185 and 72, State Highway Dept., through Northwestern Engineering to Colorado Builders Supply Co., Denver.

570 Tons, Los Angeles, overcrossing and undercrossing, Hollywood Pkwy. at Santa Monica Blvd. and at Normandie Ave., through J. E. Haddock, Ltd., to Blue Diamond Corp., Los Angeles.

280 Tons, Anaheim, Calif., bridge at Santa Ana River, 4 mi. east of Anaheim, through Chas. MacClosky Co., San Francisco, to Bethlehem Pacific Coast Steel Corp.

100 Tons, Boston, new headquarters building, Commonwealth Arsenal, through Paoria Construction Co., Boston, to Northern Steel Co., Boston.

• • • Reinforcing bar inquiries this week included the following:

270 Tons, Chicago, Psychiatric building for Michael Reese hospital. All bids rejected on Dec. 13.

189 Tons, Chicago, press and bindery building, Cuneo Press which had been reactivated during the last of November, has now again been abandoned.

• • • Railroad car awards and inquiries this week included the following:

Pacific Car & Foundry has received an order from the Northern Pacific R.R. to build 250 50-ton refrigerator cars. Chesapeake & Ohio R.R. has ordered 150 30-ton cabooses from American Car & Foundry. Great Northern R.R. has ordered 600 gondola cars from Pullman Standard Car Mfg. Co., Michigan City, Ind. Great Northern R.R. has also ordered 75 20-ton covered hoppers from the American Car & Foundry Co. Denver, Rio Grande & Western R.R. has ordered 500 50-ton gondolas from the Pressed Steel Car Co. The Denver, Rio Grande & Western has also ordered 200 70-ton gondolas from the Pullman Standard Car Mfg. Co.

50 YEARS AGO

THE IRON AGE, *December 15, 1898*

• "The 'London Engineer', whom no one will accuse of bias in favor of anything American, prints the following editorial:

'There can be absolutely no question that the automatic tool and various automatic devices applied to machine tools have come as a permanency. The days of experiments have passed, and although there may still be in this country automatic tools which need more attention than older types, on the whole, we feel the automatic tool has arrived at such a state of perfection that no longer need any hesitation be felt in adopting it. We say this with no intention of "puffing" American productions.'"

• **"Any intelligent effort to comprehend the future of the bicycle trade must be based on the fact that for a long time we cannot hope to reach the high-water mark of 1895. One reason for this is the large number of people with whom the wheel was a fad have transferred their interest to golf."**

• "We have become so accustomed to the cheap prices prevailing that it is possible we do not have a proper conception of the present purchasing power of money. An instance is fine wire nails which are selling in small lots at less than 2¢ per lb. A buyer of such nails receives over 400 beautifully finished nails and every one of them perfect, for 1¢.

• **"The Chicago pig iron market is boiling. Seldom, if ever, has such a large tonnage been placed as during the past week. A number of furnaces have sold all the iron they can deliver next year and have retired from the market."**

• "The New Departure Bell Co., Bristol, Conn., have just introduced the New Departure automatic coasting hub and brake for bicycles. This invention permits the cyclist to coast with both feet on the pedals and resume pedaling at will without pedals jumping forward. Brake gives the rider control over the wheel at all times."

Silicon Alloy Prices Up

New York

• • • Increased power and raw material costs along with generally higher production costs makes necessary a slight increase in some prices of silicon alloys and ferrocolumbium, effective Jan. 1, according to Electrometallurgical Sales Corp. Price changes are effective immediately for spot users.

The new base price for 50 pct ferrosilicon is 11.3¢ per lb of contained silicon. Other increases are as follows: 65 pct ferrosilicon is up 1¢ per lb of contained silicon; 75 pct silicon is up .5¢ and silicon briquettes are up .4¢ per lb.

The new base price for ground 15 pct ferrosilicon is $136.50 a gross ton for the 65 mesh by down size, and $139.50 for 100 mesh down.

Asks ECA Take Steps To Increase Copper Output

New York

• • • **Measures** to stimulate copper production in foreign countries, for the benefit both of the United States and of the nations participating in the European Recovery Program, were urged recently by C. Donald Dallas, chairman of the board, Revere Copper and Brass, Inc.

Mr. Dallas reported that the effect of the copper mine strike in Utah, added to the stockpiling program of the Munitions Board, had been to aggravate an already critical copper supply problem, and forced consumers to face the possibility of reduced operations and of further price increase in this basic metal. He added:

"Imports rose sharply in the months before these new conditions faced us, but did not serve to create a cushion for emergencies; in fact, combined fabricators' and refiners' stocks of copper in the United States declined by 32,000 tons in the first 9 months of 1948."

Foreseeing further increases in world demand for copper, Mr. Dallas said that "under these circumstances, and entirely apart from temporary conditions, the copper consumer is moved to inquire whether ECA has been able to take any steps to increase the supply of copper. We know that ECA operations create funds in the participating countries which are available for the purchase of strategic raw materials, but these funds are of little moment if supplies are unavailable."

Mr. Dallas raised the question of whether the Munitions Board, as part of the stockpiling program, might use ECA funds to enter into long-term contracts for foreign copper. He concluded:

"I would like to point out that the constant threat of a tariff on copper cannot fail to discourage foreign investment in the expansion of mining facilities, or in transportation to bring ore to the refineries. As you know, the tariff is currently suspended but will be reimposed after March 31, 1949, unless the new Congress acts to extend the suspension. The tariff threat would seem to make long-term measures to encourage production of paramount importance."

Personals

(CONTINUED FROM PAGE 123)

• **B. A. Holbel** has been appointed central office manager for Pontiac Motor division of General Motors Corp., Pontiac, Mich, succeeding **M. C. Goodwin**, who has resigned to become a Pontiac dealer in Grand Rapids. Mr. Holbel has been with G. M. for 24 years and with the Pontiac division since 1934.

• **James E. Coleman** has been named purchasing agent for the Manufacturers Light & Heat Co. and for its associated gas companies in the Pittsburgh Group of the Columbia Gas System, Inc., succeeding **John M. Simpson**, who has retired.

• **C. W. Lytton** has been made district manager for the Buffalo area, Lincoln Electric Co., Cleveland. **C. M. Richardson** has been appointed district manager for the northwestern Pennsylvania district with his headquqarters at Franklin, Pa. **Ray Zeh** has been appointed district manager of the Toledo district.

• **Frank L. Oldroyd** has been appointed sales manager of the industrial division of Oakite Products, Inc., New York. Mr. Oldroyd has been associated with the Oakite organization for over 15 years and prior to his recent appointment served as special field sales manager.

• **G. Henry Keeton** has been appointed sales engineering representative for the State of Michigan by Kelly Reamer Co., Cleveland.

• **Russell L. Jessee** has been appointed Central States sales manager for Gedney Electric Co., New York, with his headquarters in Chicago.

• **Roscoe Seybold** has been appointed assistant to the president with special responsibility for organizational planning and budget and operating expense control, Westinghouse Electric Corp., Pittsburgh. **C. E. Headlee** has been elected controller, succeeding Mr. Seybold. Mr. Headlee joined Westinghouse in 1919 and for the past two years has been assistant controller.

Army Engineers Order Stainless-Clad Gates For Pennsylvania Dam

Baltimore

• • • **Twenty-six gates,** each weighing 35 tons and faced in stainless-clad steel, will be built here by the Metal Products Div., Koppers Company, Inc., for the new Conemaugh River Dam in Western Pennsylvania.

The contract to Koppers was awarded by the U. S. Army Engineers, and provides for delivery in a year. Cost of the gates will be $1,237,000, according to Walter F. Perkins, vicepresident and general manager of the Koppers division.

The portals, which will hold back waters of the Conemaugh River in flood season, will use stainless-clad at all places where they touch water. This is necessary, Army engineers point out, because of the high degree of acidity of the water, much of which comes from mines of the area.

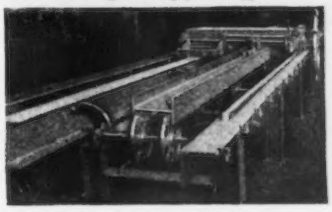
The cylinders which will operate the gates will be welded, and each will weigh about 11,000 lb before finishing. All welding in the cylinders will be X-rayed for soundness before shipping. The face of the gates will be 1 in. thick plate, of which 25 pct will be stainless cladding on the outer face.

Only other dam in the state of Pennsylvania to have the stainless-clad gates is the Loyalhanna Dam, also in Western Pennsylvania, U. S. Army Engineers said. Originally built with plain carbon steel, the gates later were removed and stainless-clad substituted because of the corrosive action of the acid waters. Koppers furnished the replacements.

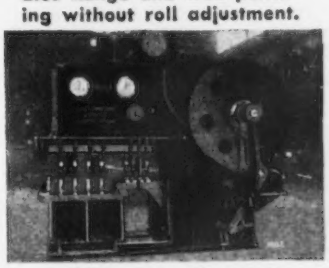
The Conemaugh Dam is one of a series of dams being built by U. S. Army Engineers to prevent recurrence of the disastrous spring floods which, on a number of occasions, have caused millions of dollars worth of damage to Pittsburgh and other Western Pennsylvania and Ohio cities.

During much of each year, most of the Conemaugh Dam gates will be open, only a sufficient number being closed to maintain a minimum pool level. During spring thaws, and when

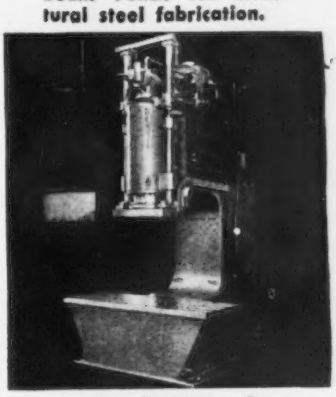
BEATTY Hydraulic Vertical Bulldozer for heavy forming and pressing.



BEATTY Spacing Table handles flange and web punching without roll adjustment.



BEATTY No. 14 Toggle Beam Punch for structural steel fabrication.



BEATTY 250-Ton Gap Type Press for forming, bending, flanging, pressing.

BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging, bending.

flood conditions threaten the areas below the dam.

The 26 gates will be installed in the dam in tandem. Thirteen of the gates will be "service gates" for formal use. The other 13 will be installed behind the service gates and can be used in emergency.

Develop New Device To Measure Vibration Like a Seismograph

Pittsburgh

• • • **A new tool** to help engineers analyze vibration—a portable industrial "seismograph"—has been developed by The Barry Corp., Cambridge, Mass., and the Westinghouse Electric Corp., Baltimore. Called a "seismograph" because it utilizes the same principle employed in instruments registering earthquake shock, it is a combination of a seismic pendulum mounting designed and manufactured by The Barry Corp. and the Westinghouse Vibrograph.

The Vibrograph, about the size of an ordinary box camera, ordinarily embosses a permanent record of vibrations on a transparent film. It records over the range of 600 to 15,000 cycles per min and amplitudes as low as 0.0001 in. or as great as 1/16 in. Mounted in the Barry frame, vibrations with a frequency as low as 120 cycles per min can be measured even in swaying buildings when no steady reference point is available.

The Barry seismic pendulum provides a Vibrograph support whose natural frequency is lower than the frequency of the vibration to be measured. The Vibrograph thus tends to remain stationary in space. The pendulum is comprised of a triangular arm supported from a vertical column by means of "frictionless" elastic hinges. The low natural frequency is attained by mounting the Vibrograph relatively close to the hinges and setting a large mass in a pan at the free end of the arm. The Vibrograph includes a prod adapted to contact the structure whose vibration is to be measured. This contact is achieved, in the case of the wall of a building, by setting the seismic pendulum in such a position that the prod contacts the wall.

Electrification Started On Lukens Steel Co. Mill

Coatesville, Pa.

• • • **Lukens Steel Co.** has started electrification of its 140-in. breakdown mill here. The mill serves as a breakdown for the company's 206-in. mill which it calls "the world's largest plate mill." The roughing mill is expected to be back in service by Feb. 1.

Since 1903, the 140-in. mill has been driven by a non-condensing Wetherill steam engine of 2250 hp. In 1903 the 140-in. mill was said to be the largest in the United States, if not the world, and its steam engine was about the last word in operating efficiency. Forty-five years of service and mechanical and electrical advances, however, have found the steam engine obsolete and worn-out, and it has been broken up and removed from its pit to make way for the modern electrical equipment which will replace it.

Until next February, production on the 206-in. mill will be lowered somewhat by the idleness of the 140-in. mill with which it is used. In the interim, the 206-in. mill will be used as both breakdown and finishing mill. This will reduce its over-all plate making output. During the construction, employees of the 140-in. mill, so far as possible, will be assigned other duties so that a minimum of layoffs is anticipated.

The new electrical equipment will include a new electric motor of 4000 hp, at 400 rpm. It will be a slip ring, wound rotor, 3-phase 60-cycle induction motor, operating on 13,200 volts A.C. The motor will be equipped with a new reduction gear, and the present pinion stand will be moved to give a longer spindle drive. An electric control panel also will be installed.

The new motor and its controls will be located in a motor room which is to be constructed partly on the site of the old steam engine base and also to the east, adjoining the 140-in. mill building. The motor room will be built of concrete and brick on a structural steel frame, with glass block as windows. It will be 20 x 60 ft in area by 55 ft high. The air in it will be precipitron cleaned. In general, in both design and equip-

ment, the building will be similar to that of the 120-in. mill.

A new crane runway also will be constructed as part of the improvements here, the total cost of which is expected to approximate $400,000.

Devises an Index To Determine Return On Research Investments

East Alton, Ill.

• • • **A method for** determining the dollar and cents return on research investments was described by Fred Olsen recently at a meeting of the Philadelphia Section of the American Chemical Society. Mr. Olsen, director of research and development of Olin Industries, Inc., told of his plan, the Index of Return, and expressed the view that research directors should place more emphasis on the returns from their research activities.

The index, as developed by Mr. Olsen, is now being used by the Western Cartridge Co., a division of Olin Industries. Original work on the index was begun in an effort to put a monetary evaluation on research projects conducted in Western's laboratories.

Fred Olsen

Western's Index determines the returns on research projects in such a manner that a board of directors can tell what the company is actually earning from completed projects and can estimate what it may reasonably expect to earn as a result of its research expenditures.

By knowing the past value of research projects, a board of directors can more readily approve the all-important research budget, according to Mr. Olsen. In showing the extent of financial returns from research to a company, the index is also beneficial to management as well as to research and factory departments.

Mr. Olsen pointed out that it is not enough for a research director to say, "Our company was built upon the results of re-

search and thus, our management knows that research pays." There is an obligation, he says, on the part of the research director to prove in clean, crisp terms that the results obtained from large sums spent on research and development comprises an adequate dollar return.

Acceleration of ERP Procurement, Payment Aided by Government

Washington

• • • **Acting with** administration approval, procurement and reimbursement authorizations under the Marshall Plan have been accelerated by the Economic Cooperation Administration.

Approval of more than $1.25 billion in aid during the month of November brings the cumulative total to about $4 billion since the program's beginning last April.

Included in the November approvals was more than $150 million worth of industrial commodities which are scheduled for delivery next year. Heavy deliveries are also scheduled for the remainder of this year.

Speeding up allocation of ECA funds in recent weeks is in line with the recently announced White House policy of disposing of the current $5.2 billion appropriation by next April rather than by June 30.

Already scheduled for shipment during the first and second quarters of 1949 is more than $50 million in industrial machinery and equipment. About 60 pct of the shipments scheduled are comprised of the manufacturing type such as textile, metal and woodworking, shoemaking equipment, etc., including some office appliances. The remainder is made up of heavy equipment such as construction, mining and similar machinery.

Other major types of industrial goods already scheduled for shipment next year include $25 million in iron, steel and steel mill products; $9 million worth of motor vehicles, parts and accessories; $8 million in machine tools, and $3 million worth of aircraft and equipment.

The foregoing figures represent

only those goods which will be supplied by the United States and do not take into account any items which are to be supplied by other participating nations.

Virtually all the industrial materials have been shipped or scheduled for Europe. Aid to China consists largely of food, grains and agricultural supplies, and fuel.

Cumulative industrial goods totals (all nations) through November include $340 million worth for machinery and equipment; $260 million for nonferrous metals; $140 million for motor vehicles and equipment; $81 million for primary iron and steel mill products; $45 million for ores and concentrates, and $11 million worth of advanced steel mill products.

Hold Quarterly Meeting For Magnesium Experts

Pittsburgh

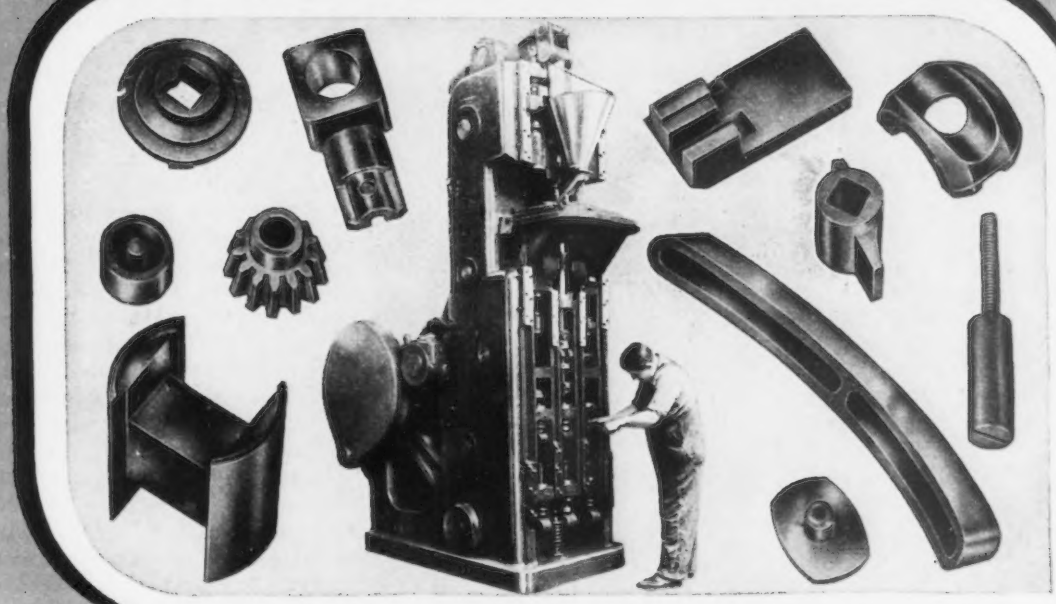
• • • **The quarterly** meeting of the Magnesium Assn. was held at the Mellon Institute here Dec. 3. The technical groups in the Pittsburgh area joined with representatives of industry and the armed services, as guests in a full day's discussion of Magnesium and its uses. Twelve members of the Aircraft Research and Testing Committee, representing the outstanding aircraft manufacturers, held their quarterly meeting in Pittsburgh in order to participate in the program.

The program started with a discussion of Mellon Institute's contributions to the advancement of Magnesium through research programs. This was followed by a talk on "Paint Protection" by Robert I. Wray, Aluminum Research Laboratory, New Kensington, Pa.; one on "Stress Analysis and Design Considerations For Magnesium" by Dr. George Found, Magnesium Div., Dow Chemical Co., Midland, Mich.; and one on "Corrosion" by W. S. Loose, Laboratory Development Div., Dow Chemical Co.

Mr. Edward S. Christiansen, president, Magnesium Co. of America, Chicago, and Dr. Louis A. Carapella, Senior Industrial Fellow on the National Lead Co.'s fellowship, Mellon Institute, acted as Co-chairmen.

ASK STOKES

Design for Powdallurgy* production to cut Manufacturing costs



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STOKES KNOWS HOW

Electrical Equipment Sales Expected At A Brisk Pace Next Year

Cleveland

• • • **Sales of** electric motors, generators, adjustable speed drives and controls in 1949 will match and possibly exceed today's high buying level, according to a concensus of district managers and field sales engineers of Reliance Electric & Engineering Co., following a four-day sales forum held here recently.

Expectations that electrical equipment purchases by industrial consumers will continue at a brisk pace next year were based on: (1) Plant expansion projects and equipment modernization programs which many producers of industrial goods and consumer products have on the drawing board, (2) installation of additional generating capacity by electric utility companies to meet long-range power requirements of industry and home, factory and farm, (3) increased mechanization of operations to offset rising production costs.

C. D. Herbert, Reliance's New York district manager, reported that corrugating mills along the Atlantic Seaboard are equipping their automatic folding and tapping machines with variable-speed drives to get higher output at lower cost.

With one eye fixed on greater production and the other on lower costs, producers of corrugated boxes, paper and paper products, textiles and steel strip in the section around Philadelphia are adding new electric drives to present plant equipment or replacing obsolete units with new ones. K. S. Lord, Philadelphia district manager for Reliance, also indicated that the national rearmament program has given shipbuilding a "shot in the arm" which, in turn, is reflected in more orders for motors.

In the Pittsburgh area, C. V. Gregory, Reliance district manager there, said that interest of steel producers and metal fabricators in the installation of motor drives on finishing equipment continues to run high. Relocation of present plants and location of new ones at Pittsburgh to get closer to steel supply sources, also was viewed by Mr. Gregory

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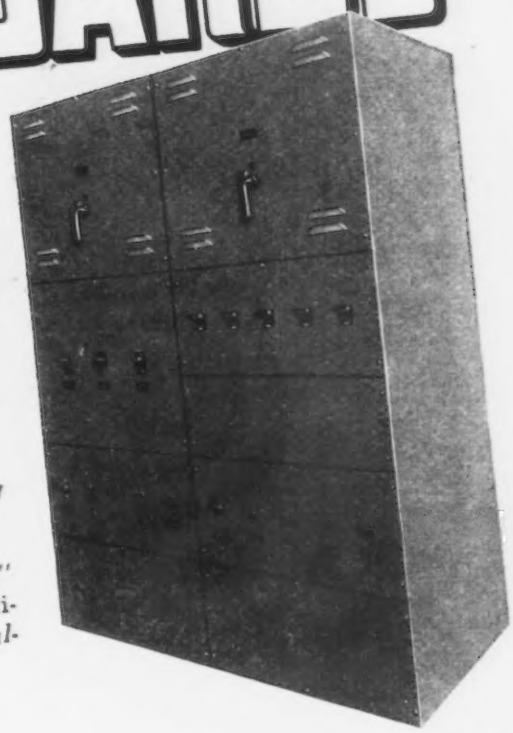

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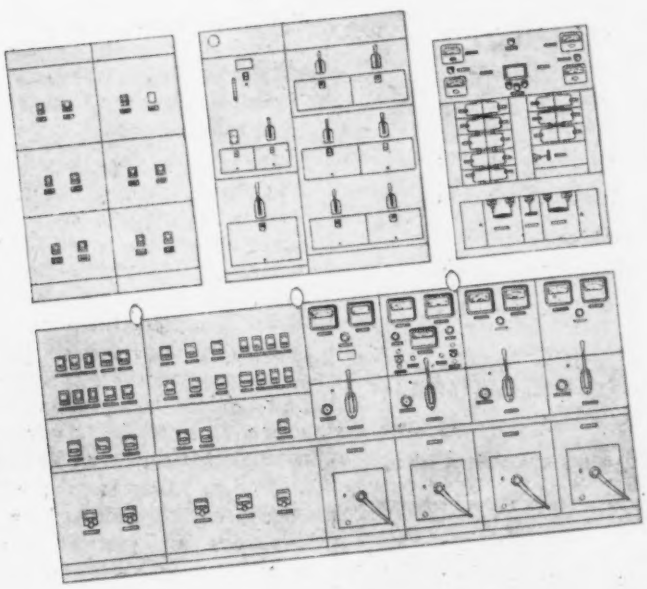
EXPERIENCE—design and manufacturing "know how" gained through long experience in electrical distribution and control equipment fields, and *specialization* in switchboards.



Switchboards are the *foundation* of all electrical distribution systems. Sound basic design and dependable equipment are essential to effective protection and consistent, long-time service.

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as a spur to demand for motors, generators and related equipment in this territory during the coming year.

Increased emphasis by makers of heavy machine tools on new designs that call for faster operation, less down-time, and lower cost per piece also will mean greater utilization of automatic or semi-automatic operations requiring more motors and control, in the opinion of two other Reliance district managers, W. W. Spanagel, Cleveland, and R. A. McDowell, Cincinnati.

R. O. Herbig, central western sales manager headquartered in Chicago, said that this trend toward higher and higher machining speeds has become particularly pronounced in Chicago, St. Louis and all other industrial centers in the central western area.

Reporting on the Detroit area, J. L. Buell, Jr., said that the reconstruction program for foreign countries is expected to accelerate demands of steel and tubber manufacturers for ac and dc motors.

A. L. Lemon, Birmingham, pointed out that the textile industry in the South is becoming more "adjustable-speed conscious" from a quality control standpoint primarily, citing slasher and range drives as two of many typical examples.

Demand for motors and allied equipment throughout the southwest will continue heavy for some time, according to F. A. Denison, Houston, due particularly to the amazing growth of the Gulf Coast "chemical empire" and the soaring production of paper and paper products. Establishment of new plants and enlargement of present units in other lines of manufacturing activity were viewed as other factors which can be confidently counted on as contributors to greater "motorization" of southwestern industrial plants and processes.

The Pacific Coast picture is similar in many respects in the eyes of H. A. Latta, Los Angeles district manager for Reliance. Here, he said, many eastern and midwestern companies are currently building or buying manufacturing facilities. Steel producers are investing heavily in expansion, and

this should stimulate other manufacturing, Mr. Latta declared.

These opinions, selected from this spot-check survey at random, largely reflect those of other Reliance district managers and field sales engineers. While their views on the 1949 outlook for electric motors and allied equipment are tempered by varying conditions prevailing in their respective areas, all are generally agreed that the demand for specialized electrical equipment will continue unabated so long as these units help manufacturers to make more and better products at lower cost.

Outlook for ECA Machine Tool Business Brightens

Washington

• • • **Indication** that the bottleneck in the ECA machine tool business may soon be broken is seen here with the approval during November of nearly $10 million worth of purchase and reimbursement authorizations.

Arrangements for purchase and delivery of most of these authorizations are still to be made with American industry. About $2.1 million of these procurements have been approved for first quarter 1949 delivery and $5.5 million for the second quarter. No schedules were given for the remaining $2.4 million.

Largest single purchase authorization was made for the United Kingdom, which is expected to place nearly $6 million worth of orders for second quarter delivery.

Second largest individual applicant was Holland for which purchase authorizations of $2.1 million were approved during the month. No delivery dates were scheduled.

French purchases of more than $1.9 million worth of tools has been approved for first quarter delivery; at the same time, a total of $50,000 worth was approved for French territories.

Other authorizations included $330,000 worth for Norway—$90,000 for the first quarter, $50,000 for the second, and another $190,000 unscheduled — and Greece with $100,000 worth, delivery to be split equally between the first and second quarters.

Wider Use of Oil, Gas Has Strong Influence On Shipments of Steel

New York

• • • **Manufacture** of automobiles, diesel engines, tractors and heating furnaces, with expansion of the oil and gas industries to fuel them, has required more than one-fifth of the finished steel production since the end of the war, according to the American Iron and Steel Institute.

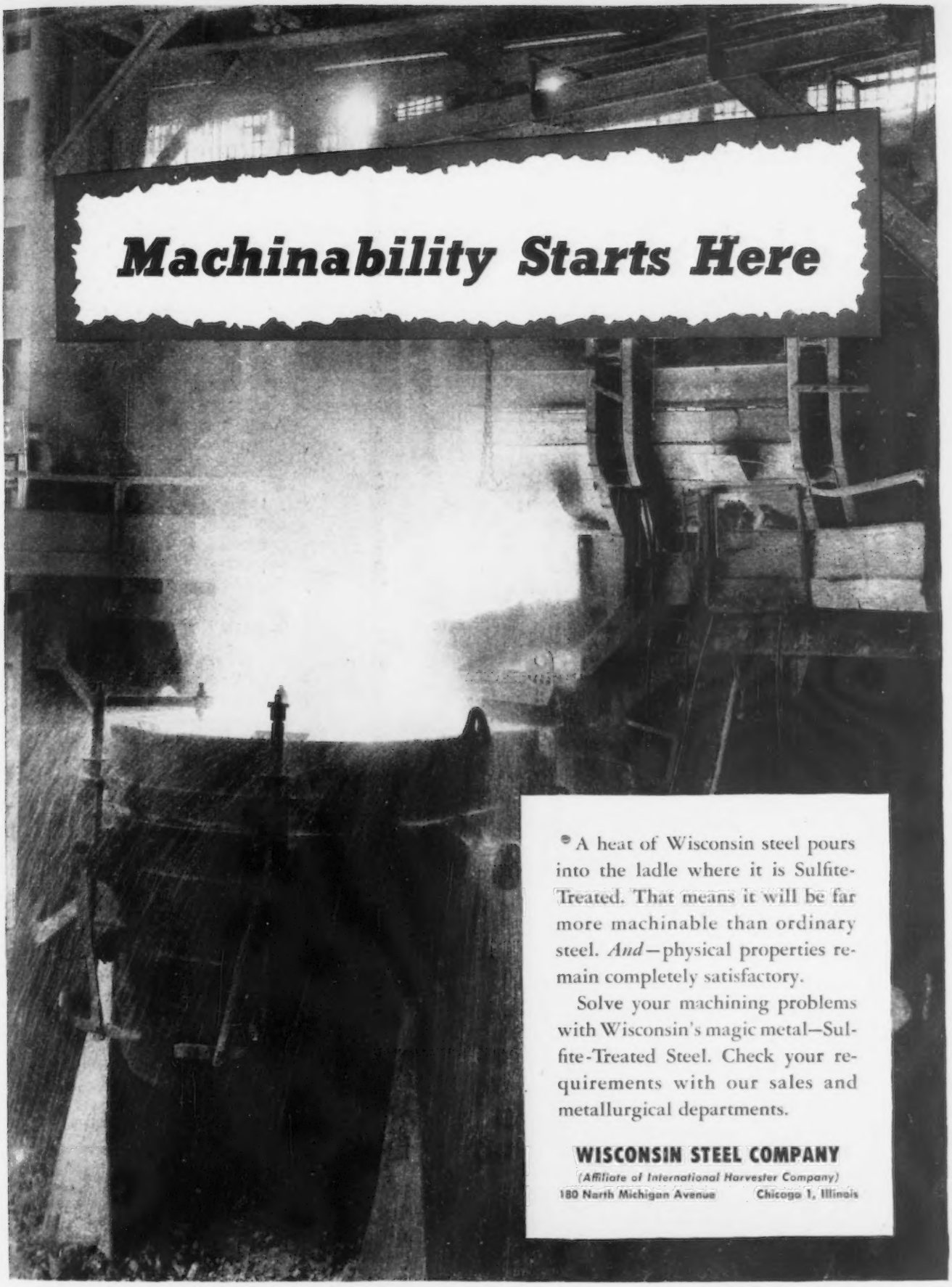
With the United States using more oil and natural gas than ever before, heavy demand for steel for production and marketing of these fuels is expected to continue. These two industries have announced that they plan to spend a record total of more than $10 billion to expand their facilities between now and 1952. Gas utility expenditures for construction alone are estimated at about $800 million this year. The oil industry's capital expenditures for crude production facilities are expected to total around $1.4 billion in 1948.

In the first 8 months of 1948, oil and gas received a tonnage of steel equal to 87 pct of the total amount of steel they received in all of 1947. The two industries appeared likely to receive more than 4 million tons of steel in the full year of 1948, a larger tonnage than ever before, according to available records. Their share of total steel shipments exceeded 6 pct in the first 8 months of this year, against 5 pct in 1947.

Shipments of steel pipe and tubes totaled 4,410,000 tons during the first 8 months of 1948, an increase of 11 pct over the record shipments of the first 8 months last year. Approximately 23,500 miles of pipelines have been placed in operation from the end of the war in 1945 through 1948.

Meanwhile, the amount of steel in use in equipment consuming non-solid fuels has risen sharply.

At the start of this year, approximately 39,500,000 motor vehicles were in use in the United States, according to the Automobile Manufacturers' Assn. It is expected that output for the full year 1948 will be more than 5 million vehicles. Shipments of finished steel to the automotive industry totaled more than 23 mil-



WISCONSIN SULFITE-TREATED STEEL

lion tons from the end of the war in 1945 through July 31 of this year.

On the railroads, more than 5100 diesel locomotives will be engaged in all service by the end of 1948. Fifteen years ago, no diesels were engaged in road service. More than 500,000 ton of steel have gone into the diesel locomotives made in the past 15 years.

More than 2 million oil burners have been made and shipped since the end of the war. Between three and four million are in service in the United States, in addition to several million portable or semi-portable heaters. More than 2 million automatic gas-fired heating systems are in operation, in addition to another 2 million gas-fired unit heaters and space heaters.

More than 3 million tractors now are in use in the United States in agriculture, and the use of non-solid fuels on farms has increased in many other ways.

Opens New Laboratory

Matawan, N. J.

• • • **The formal opening** of the new Hanson-Van Winkle-Munning electrochemical laboratory was held here recently. Representatives of the press, technical societies and individuals in public life were invited on the company-conducted inspection tours of the new building. This was followed by a reception on the premises.

Heart of the new 3-story laboratory (15,000 sq ft of floor space) is the plating room on the first floor. Equipment installed here includes complete apparatus for experimental and sample cleaning, pickling, plating and anodizing. Here will be conducted most of the final tests from which will come concrete recommendations and contributions to the industry. The equipment includes virtually every known device for scientific operation of electroplating solutions.

A large analytical laboratory on the second floor is used primarily for customers service, involving the analysis of plating solutions and investigating difficulties encountered in the application of electrodeposits. The research laboratory is devoted to the investigation of new products and processes and fundamental studies of problems related to metal finishing.

FRONT ROW, left to right: L. R. Horne, Boston; G. D. Caffrey, New York; V. R. Jones, manager Food and Beverage Department, Wyandotte; Carter B. Robinson, vice president—sales, J. B. Ford Division, who completed 25 years in 1942; F. A. Kilpatrick, San Francisco; and C. R. Beaubien, Detroit. SECOND ROW: B. J. Rosenthal, Minneapolis; P. B. Johnson, Kansas City; A. A. Bettner, Milwaukee; Tom Blair, Wyandotte; M. W. Millard, Toronto; J. A. Troxell, Dayton; and B. B. Baker, Portland.

Sales Representatives Receive Service Awards

• • • **Thirteen sales** representatives of the J. B. Ford Div. of Wyandotte Chemicals Corp. recently received gold watches commemorating 25 years of service to the company and its customers.

This brings to 1342 the total number of Wyandotte Chemicals employees who have won quarter century honors. Of this total number, 82 watch award men and women are members of the J. B. Ford Div. of Wyandotte Chemicals.

In awarding the watches, E. M. Ford, president of Wyandotte Chemicals, told the 400 employees, supervisors, executives, and officials attending the watch banquet: "These watches are a symbol on our 58th anniversary of the contribution that you have made to the company and to our country. It is my prayer that all of us keep ourselves so well informed regarding the way we live and are allowed to live that we carefully guard and maintain our priceless democracy."

o o o

Downward Trend in Iron, Steel Exports Continues

Washington

• • • **The volume** of iron and steel exports continued its downward trend in September, according to the Dept. of Commerce. The month's export tonnage amounted to 291,764, nearly 17,000 tons below the previous low of 308,484 net tons in August.

Total exports for the first 9 months of 1948 thus reached a figure of 3,377,846.

Net tonnages of iron and steel commodities exported during September are:

Ingots, blooms, billets, slabs, sheet bars, 18,499; wire rods, 2398; skelp, 4160.

Iron bars, 42; concrete reinforcement bars, 6645; steel bars, cold finished, 3288; other steel bars (excluding alloy), 15,482; alloy steel bars, 3855; welding rods, electric, 925.

Boiler plate, 1565; other plates, not fab., 23,690; plates, fab., punched or shaped, 1355; iron sheets, black, 1254; steel sheets, black, 27,843; galvanized sheets, 5119; strip steel, cold rolled, 4444; strip steel, hot rolled, 5153; tinplate and tagger's tin, 41,974; terne plate (incl. long ternes), 424; structural shapes, plain, 19,321; structural shapes, fab., 9383; frames and sashes, 318; sheet piling, 2893.

Rails, 60 lb per yard and over, 18,911; rails, less than 60 lb per yard, 1057; rails, relaying, 1485; splice bars and tie plates, 2093; frogs and switches, 708; railroad spikes, 649; railroad bolts, nuts and washers, 325; car wheels, tires and axles, 4051.

Seamless black pipe, 1188; seamless casing and oil line pipe, 14,530; seamless boiler tubes, 2882; welded black pipe, 4348; welded galvanized pipe, 2467; welded casing and oil line pipe, 9015; welded boiler tubes, 137; other pipe and fittings, 5208.

Plain wire, 4958; galvanized wire, 3803; barbed wire, 3000; woven wire fencing, 716; woven wire screen cloth, 472; wire rope and strand, 1081; wire nails, 1478; other wire and manufactures, 3157.

Horseshoe nails, 5; tacks, 222; other nails, incl. staples, 553; bolts, nuts, rivets, and washers, except railroad, 3154; forgings, 2054; horseshoes, 27.

Ohio Employment Service Sees High Employment In Metals Industries

Cleveland

• • • **Continued high** employment in the metals industries in the Greater Cleveland area, probably throughout 1949, was indicated this week in a special report prepared by the Ohio State Employment Service.

The report, which includes current worker tabulations and comparison with wartime peaks, indicated that apart from the uncertainties of demand, a shortage of steel and possible labor-management disputes would be the limiting factors in employment next year.

Highlights of the OSES report revealed that:

Despite shortages of manpower and materials, the steel or primary industry here has tended to stabilize employment.

In September, there were approximately 49,300 workers in the primary metals industries, about 1.5 pct more than the number employed in September, 1947. With consumers clamoring for steel, the outlook for continued high employment appears favorable, the report indicated.

Dislike for shift work and the nature of the work were contributing factors to above-manufacturing separation rates in 1948. Approximately 4.4 per 100 workers were separated from their jobs in steel plants. Separation rates in the primary metals industries averaged 3.7 pct in February, 5.3 pct in April, 4.0 pct in June and 4.4 pct in August. Hiring schedules were limited by shortages of coke, sheet steel, pig iron and components.

Iron and steel foundry employment increased fractionally from 12,400 in November 1947, to 12,800 in September 1948. Although the level of employment remained relatively stable, unwillingness of workers to accept or remain in foundry jobs prevented full staffing during the hot weather months, the report stated.

Turnover in the foundries was lowest during the spring season. Quit rates were highest in late summer. Approximately 6.4 of every 100 workers were separated from their jobs in August.

In the nonferrous metals indus-

try here the OSES report noted demand for nonferrous metals has been accelerated by the national defense program. Despite lagging customer orders late in 1947, the nonferrous metals industry increased employment about 4 pct from 15,400 in November 1947, to 16,000 in September 1948.

But the boom for nonferrous metal products probably will be limited by lack of raw materials in 1949, the report pointed out.

Turnover rates in the nonferrous metals industry were high. The hiring rate averaged 6.5 pct. Separation averaged 6.4 pct in 1948.

Employment in the primary metals industries, excluding iron and steel foundries and nonferrous metals plants, declined slightly from 20,750 in November to 20,450 in September 1948. Reduction of customer orders and heavy turnover of laborers recruited from out-of-area impeded expansion in the spring of 1948, the report stated. Job shifting in this segment of the primary metals industry is slowing down. Separations amounted to 2.4 pct in February, 4.3 pct in April, 2.8 pct in June and 2.5 pct in August.

Employment by fabricated metal products companies reflected uncertain consumer demands, shortages of materials, and closing of plant facilities as the number of workers dropped from 17,750 in November 1947, to 16,200 in September 1948.

Non-electrical machinery manufacturers in this area, who employed 73,000 workers at their wartime peak in April 1943, employed 60,900 workers in September 1948, nearly 3 pct less than the number employed in November 1947.

The postwar backlog of orders for non-electrical machinery has been reduced and producers have been hampered by cancellations, shortages of manpower, sheets, pig iron and components, according to the OSES report.

There was slight change in employment in the metalworking machinery industry during the past year. Inventory accumulations, reduction of customer orders and shortages of men and materials retarded hiring schedules, the report indicated.

Metalworking machinery plants employed 16,750 workers in Sep-

OUT OUR WAY

tember 1948, fractionally below the level attained in November 1947.

Shortages of sheet metal workers, tool makers, die makers, machinists, turret and engine lathe operators, milling machine and radial drill operators were experienced by employers.

Average separation rate reported by the metalworking machinery industry for the past year was 3 pct. A large number of plants scheduled 40 to 45 hrs per week, weekly hours ranged between 32 and 55 hr.

Other non-electrical machinery, including general industrial machinery and equipment, indicated that demand for vacuum cleaners, washing machines and other household appliances was reduced in 1948. Reflecting surplus inventories, uncertain consumer demands, labor and material shortages, manufacturers of general industry machinery, household machinery and other non-electrical machinery cut back employment from 45,800 in November 1947, to 44,100 in September 1948.

Fewer workers, OSES reported, were employed in electrical machinery plants in 1948. Handicapped by dwindling customer orders, shortages of men and materials and labor-management disputes, makers of electrical machinery employed 25,100 persons in September 1948, about one-tenth below the level of November 1947. Despite the employment slump, this year, defense orders for aircraft parts are expected to accelerate hiring schedules in 1949.

In transportation equipment, despite the heavy demands for automobiles and improvement in aircraft parts orders, employment in this industry slumped in 1948. Approximately 28,400 workers were employed in the manufacture of transportation equipment in September 1948, about 8 pct below November 1947. Uncertain demands for automotive replacement parts, inventory accumulations, and shortages of materials tended to retard expansion in aircraft parts and motor vehicle equipment firms.

Job outlook for 1949 is promising. AAF requirements should have an important effect in employment in Cleveland.

At war peak, October 1943, makers of aircraft and aircraft parts had nearly 59,000 payroll employees, while only a few thousand are now employed in this industry.

Greater use of the current work force, and some relaxation of employers' hiring standards may be necessary to meet the labor demand.

Work week ranged between 40 and 45 hr, with a majority of transportation equipment plants working 40 hr per week.

Pushes Construction On Big Lights for Airlift

Pittsburgh

• • • **Construction of 42** of the world's brightest lights is being rushed so they can be installed by the U. S. Air Force at German airports to help pilots flying the Berlin airlift in landing when visibility is low. A 6-light system will be installed at each of the seven different airports, including Berlin's Tempelhof Airdrome, to reduce the hazard of fog, snow, and rain and assist pilots in locating the field visually despite bad weather.

W. C. Norvell, manager of aviation lighting for the Westinghouse Lighting Div., which makes the lights, reports that the first 2 sets of 6 lights each will be delivered to the Air Force shortly.

The 6 lights in each system will flash, one after another, in the wink of an eye and appear as a streak of lightning to the pilot. The line of 6 lights will flash about 40 times a min. Each of the new lights, containing the rare gas, krypton, has a brilliance of more than 3 million beam cp. Tests have indicated that this flash will cut through at least 1000 ft of fog.

The first commercial installation of the new approach lights already has been made at New York's new International Airport on Long Island where a row of 70 lights extends out into Jamaica Bay on a special pier. In addition, a test installation of 6 lights —3 krypton and 3 neon—has been operating at the Cleveland Municipal Airport for more than a year and a half and has already been credited with saving lives. The 6-light systems for the Airlift are intended as identification and lead-in lights for the standard approach systems. They will be installed in a row 1000 ft long at 200-ft intervals out beyond the end of the instrument runways.

Coal Lab Studies New Angles, Lower Cost On Carbonization of Coal

Pittsburgh

• • • **An important part** of the research program of Pittsburgh Consolidation Coal Co. is the application of new techniques and processes to broaden the use and lower the cost of coal carbonization. Visitors to the recent opening of the company's new research center at Library, Pa., saw examples of this research work on coal carbonization and on a related study of processing the tar produced by carbonization.

An example of the commercial use of carbonization is the Disco process to produce a smokeless solid fuel and valuable tar products. Another is the established by-product coke industry. There is, nevertheless, a broad field for further exploration in this method of coal processing, and the Research and Development Division is conducting a methodical study of the whole subject.

When heated to about 800°F or above, coal is converted by carbonization into a char-like residue, a tar, and a gas of high-heating value. In one such conversion conducted in the company's pilot plant facilities located on company property near Imperial, Pa., 19 miles west of Pittsburgh, coal from the mine is crushed and the fluidized-solid technique employed. In this form the solid can be handled almost like a liquid, assuring more uniform temperature distribution and a faster reaction. Heat is added under precisely controlled conditions of time, temperature and pressure to yield the maximum of gaseous or liquid fuel, whichever is desired. A granular residue of char is left. This char is highly reactive and is almost equal in heating value per pound to the original coal.

Several potential uses for the char product of carbonization are indicated. It can be burned under boilers, or used in the production of a smokeless fuel for domestic purposes. Finally, it can be used as a feed material in gasification, for synthetic liquid fuel production.

The division is sponsoring exploratory tests at Battelle Memorial Institute, Columbus, Ohio, to

3 ways photography shows the behavior of materials under stress

1. Photographic trace recording to study the behavior of materials under dynamic stress conditions . . . Using bonded wire strain gages coupled to oscillographs, this technic makes it possible to record and measure changes in stress during rapidly applied loadings. This trace recording shows strains at three points along a shouldered bar under longitudinal impact.

2. Photoelastic stress analysis to study the behavior of materials under static or dynamic stress conditions . . . Using polarized light sent through plastic models of the part under test, this technic enables the design engineer to evaluate stress concentration factors and obtain a precise knowledge of actual peak stresses prevailing. This photoelastic stress pattern shows regions of high stress in meshing gears.

3. Photo-grids to study the behavior of materials under tensile stress conditions . . . Using the Kodak Transfax Process, involving a Kodak light-sensitive material, as many as 200 accurately spaced lines per inch may be photoprinted on the material itself. After deformation, measurement of these lines will reveal distribution of plastic flow. This photograph shows photo-grids on a flat tensile specimen after elongation.

Use of photographic technics to help study the behavior of materials under stress is becoming more and more general. Why not look into these methods to determine whether they can be used to study your own products? You can set up these testing procedures relatively inexpensively in your own plant, or have such tests made by any of a number of organizations that specialize in this work. Kodak will be glad to supply you with further details.

Eastman Kodak Company, Rochester 4, N. Y.

"Kodak" is a trade-mark

FUNCTIONAL PHOTOGRAPHY

. . . is advancing industrial technics

Kodak

develop efficient methods of burning char under boilers. Combustion experts of several power companies are advising with the division on this project.

There is now in operation near Imperial, a large pilot plant for the continuous carbonization of bituminous coal. This unit is producing tar, high-Btu gas and char, under various test conditions.

Crude tar from coal carbonization is useful as a liquid fuel for certain applications, but its overall value can be materially increased by refining it to specification fuels and by processing portions of the tar to marketable chemicals. The research problem here is to determine what is in the tar produced by carbonization under different conditions, and then to devise means for isolating the valuable components.

Although progress has been made along these lines with tar produced in conventional coke manufacture, tar from lower temperature carbonization such as the Disco process, and others being studied by the division, is a comparative newcomer. So far the work of the division has shown the presence of many useful and valuable chemicals. Some of these products are now being isolated by a new process in another pilot plant.

REVERSIBLE PROPS: *Test pilot checks propellers in reversed position (front) and normal position (rear). Reversible propellers in flight are used to make a sharp increase in an airplane's rate of descent.*

Named Chief of Div. for Farm Machinery Planning

Washington

• • • **William J. Fisher,** president of the A. B. Farquhar Co., of York, Pa., manufacturers of farm machinery, will direct the mobilization planning activities of the agricultural machinery and implement division of the National Security Resources Board, Chairman Arthur M. Hill has announced. At the same time, Arthur U. Sufrin, of Philadelphia, Pa., was appointed deputy director of the division.

Mr. Fisher has been associated with the Farquhar concern more than 40 years. He served as a member of the farm machinery industry advisory committee of the War Production Board during World War II. He is now a member of the executive committee of the Farm Machinery Institute, and also of the advisory committee on farm equipment of the Dept. of Commerce.

Mr. Sufrin was assistant director of the farm machinery and equipment division of the WPB during World War II.

First Stratojet Delivered

Seattle

• • • **The first** Boeing XB-47 Stratojet, the world's fastest bomber, has just been delivered to the Air Force following completion of acceptance tests. The swept-wing, six-jet bomber is being turned back to Boeing, however, for extended flight test programs under an Air Force contract.

Tests are continuing on a sister ship preparatory to its final delivery.

The Air Force and Boeing also announced this week that Boeing's Wichita, Kansas division will go into production on the Stratojets, the initial contract calling for ten ships.

Plan Ore Production Soon

Anacortes, Wash.

• • • **Reduction of** chrome ore will become a reality in this area next year if the plans announced by A. L. Atherton of Seattle, vice-president of American Chrome & Magnesium Industry Inc., mature. He has announced that his com-

pany will construct a plant beginning in December.

Ore is expected to come from the Twin Sister Mountains in Whatcom and Skagit counties and from the Transvaal in South Africa.

Chromium Mining & Smelting Co. is offering $21 a gross ton for chrome ore delivered at the Grants Pass, Ore. area on highway 199. Minimum specifications call for 45 pct of Cr_2O_3 content, 2.5 to 1 chrome-iron ratio. The company is reducing its ore at Mead, Wash. in the ferro-chrome furnaces used during the war for the production of alloys needed in a magnesium production plant.

Kaiser-Frazer Expanding Its Warehouse Facilities

Detroit

• • • **The expanding** volume of Kaiser-Frazer's parts and accessories business has made it necessary for the company to lease additional warehouse space, according to K-F officials.

Kaiser-Frazer has recently concluded a lease of a parts and equipment warehouse depot in Franklin Park, Ill., that will provide 218,000 sq ft of storage and shipping facilities. The warehouse will be erected by the Howett Co. of Chicago. Estimated cost of the new facilities to be erected on a 10-acre parcel of land on Belmont Ave. will be $1,100,000.

According to a K-F spokesman, Kaiser-Frazer has outgrown the 70,000 sq ft of storage facilities located at Willow Run. The new Chicago depot will be the first storage facilities located outside of Michigan.

At the present time, Kaiser-Frazer has more than 4300 distributors and dealers.

Mellon Institute Starts Coal Research Program

Pittsburgh

• • • **Dr. E. R. Weidlein,** director of Mellon Institute, has announced the establishment of a research fellowship by the Western Pennsylvania Coal Operators Assn. The program of this fellowship, which will be started during the first part of January, will embrace scientific studies of

the causes, prevention and control of coal-refuse fires.

Dr. William L. Nelson, who will head the fellowship, will investigate the reactions of coal and inorganic sulfides, especially at low temperatures, and will accord research to all factors entering into the problem of the spontaneous combustion of coal-waste, particularly where heaped or piled. In this work he will have the advisory guidance of Dr. George D. Beal, assistant director of Mellon Institute, and of a technical committee including Charles B. Baton, Greensburg-Connellsville Coal and Coke Co.; Henry F. Hebley, Pittsburgh-Consolidation Coal Co.; J. B. Morrow, Pittsburgh-Coal Co.; and Harry A. Sutter, executive vice president, Donor Assn.

Commenting on this projected research, Dr. Weidlein said: "We trust this far-reaching program relating to an important industrial and communal problem will enable the acquisition of knowledge applicable in preventing or controlling coal-refuse fires throughout this area and elsewhere.

Westinghouse Denies Federal Grand Jury Charges of Monopoly

Cleveland

• • • **Westinghouse Electric** Corp. has denied Federal Grand Jury charges that it has restrained trade or engaged in monopolistic practices in the sale of street lighting equipment.

"Westinghouse has never knowingly violated any Federal or State law in the sale of its products," said W. F. White, manager of the Westinghouse Lighting Div., Cleveland. "It certainly has not entered into agreements to monopolize or restrain trade in the sale of street lighting equipment. Since street lighting equipment for the most part is standardized equipment, prices are publicized widely and well-known to everyone interested, customers and competitors alike.

"It is unfortunate that the Dept. of Justice sees fit to bring criminal charges in situations of this type. Such action can only confuse the public and business."

MACHINE TOOLS

. . . News and Market Activities

Foreign Business Shows Some Improvement in Recent Weeks

• • • **With the end of** the third postwar year in sight, reports from major sales sectors of the machine tool industry this week indicate that foreign business has improved considerably for some segments during the past 8 weeks, but that this fall has lacked generally the seasonal up-trend in new firm orders which made the fall of 1947 the best part of the year.

Foreign orders responsible for the recent improvement have not stemmed from ECA sources, but from South America, primarily, along with some European business that has been hanging fire due to an unwillingness to spend private funds. Trade sources are inclined to attach significance to the apparent change in the attitude on the part of European buyers with private funds. So certain segments of the industry are winding up the year with as much as 25 pct more business in the sock than their most optimistic estimates indicated at this time last year, on the basis of dollar volume.

These same segments look for the foreign business to be better than domestic in 1949, with or without ECA. Present indications are that this will not, unfortunately, be a pattern for the industry, but some company spokesmen cite October and November foreign sales figures as proof that the business, in varying amounts, is there. The fact that some companies have shown what amounts to marked improvement during the past 8 weeks or so also points up the extremely spotty nature of the machine tool sales pattern at the present time.

Some segments of the industry, which are among those most active in foreign markets, expect disappointments from ECA next year, and are already reconciled to the red tape and delay which they believe will attend that business. This is neither criticism or lack of gratitude, the boys are simply hungry, but these same companies expect to do as much as 50 pct more foreign business in 1949 than they did this year, an estimate that probably encompasses some ECA business.

Some Segments of Industry Expect Disappointments From ECA Next Year

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In Cleveland, New Britain Machine Co., New Britain, Conn., has purchased the plant and certain other assets of Lucas Machine Tool Co., according to an announcement by McDonald & Co., and R. S. Howe, vice-president of New Britain Machine Co. The price was not disclosed.

Operations will be continued here in the Lucas plant as a division of New Britain Machine Co., under the direction of H. N. Stephan, present Lucas vice-president and general manager.

New Britain Machine Co. was founded in 1885 and is a large and important producer of automatic screw machines, chucking and boring machines. Lucas Machine Tool Co. was founded 49 years ago.

Elsewhere in Cleveland, Irwin F. Holland, general superintendent, Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, said the business outlook for the next 6 months is very bright.

"Beyond that, I hesitate to predict, in view of the experiences of the experts in forecasting recent happenings," Mr. Holland added.

Mr. Holland was the guest of honor at the 12th annual Christmas party of the Cleveland Chapter of the American Society of Tool Engineers, of which he is national president.

The business future to some extent is dependent on what business legislation is enacted by the next Congress, he declared.

He added that a major part of the proposed $15 billion in the budget for national security would go to the aircraft industry one way or another and fan out to related industries.

According to Mr. Holland, much of the funds will be for personnel, but with the atomic bomb, the rearmament program must revolve around the aircraft industry. Even though a substantial part will go to the aeronautical field, nevertheless, preparedness has a much broader scope than any single industry, he added.

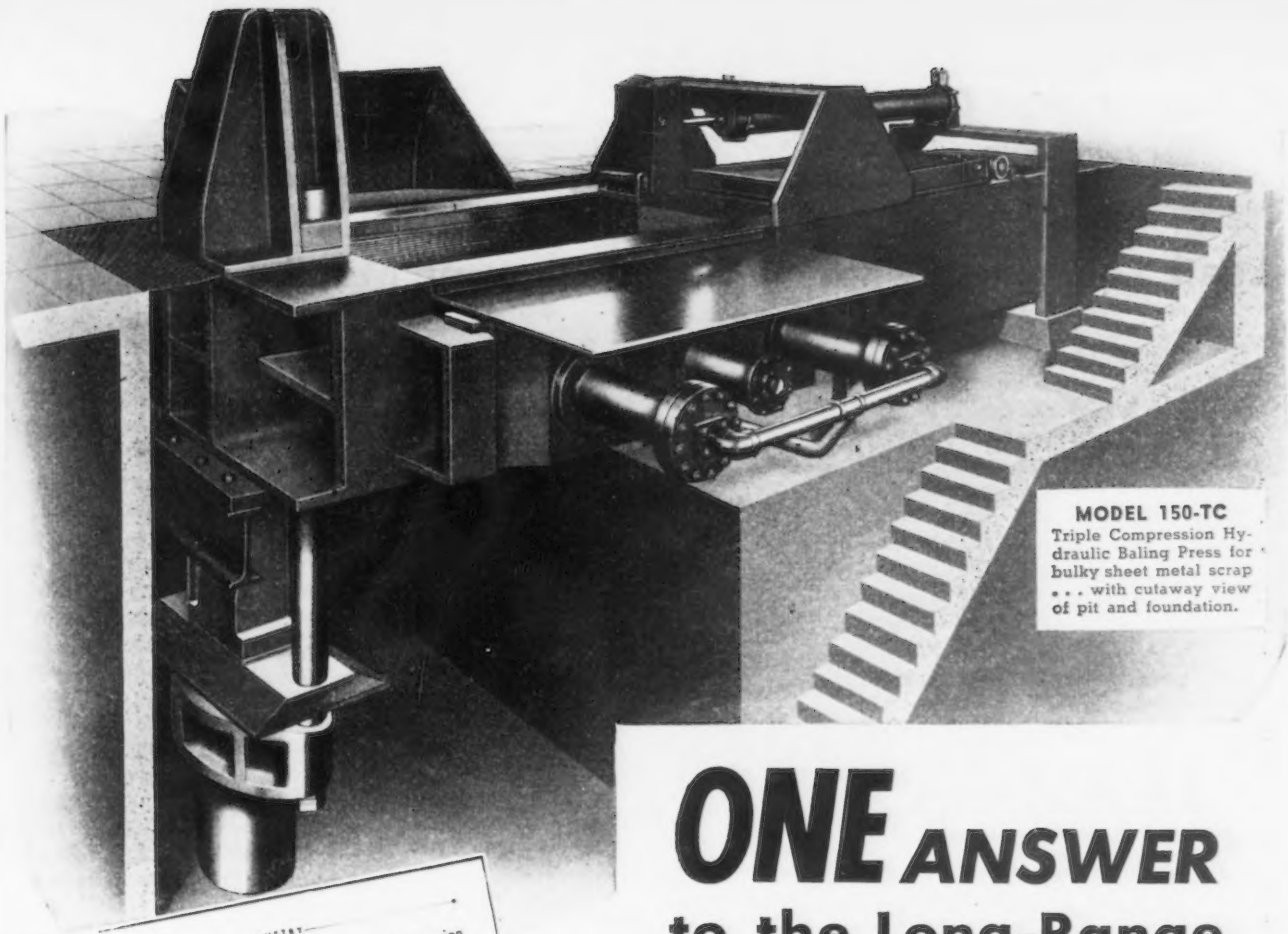
"It must be a balanced program all along the line and affect other companies," Mr. Holland said.

In Detroit the machine tool industry is very quiet at the moment. Ordering has been spotty and anticipated buying at the year end has been disappointing, according to most quarters.

Reports out of Saginaw indicate that the new Chevrolet automatic transmission may be slowed up pending further engine developments. One report indicates that a minimum of 120 hp is essential for efficient operation of these new transmissions. It is known, however, that once production is started, large scale output can be expected.

Tool and die shops in the Detroit area have picked up slightly, but operations are continuing at low levels in this segment of the industry. Many jobbing foundries are reported down to 2 or 3-day operations per week, although some 1950 dies for Fisher Body are known to be in process.

One of the brighter spots at the moment is the tank arsenal where considerable activity has been reported in recent weeks.



MODEL 150-TC
Triple Compression Hydraulic Baling Press for bulky sheet metal scrap . . . with cutaway view of pit and foundation.

ONE ANSWER to the Long-Range Scrap Shortage

Proper classification and baling of all available sheet metal scrap can go a long way toward relieving the long-range scrap shortage. Reduced to dense, compact bales of proper size — sheet metal scrap is extremely valuable raw material for the steel mills.

You can contribute to the *continued expansion* of iron- and steel-making capacity by planning *now* for *future baling* of your sheet metal scrap. At the same time, you can reap the benefits of a most profitable operation in your plant.


NEWS OF INDUSTRY

Long-Term Scrap Shortage Seen As Bar To Huge Steel Expansion

Those Demanding Big Program Said to Ignore Quantities Of Scrap Required

It is estimated that only about a fourth of the 20 million gross tons of the scrap bought by steel mills last year was industrial scrap —that generated in industry as a waste product of steel fabricating. This leaves almost 15 million tons of purchased scrap that originated because things wore out or became obsolete. Of this about 2 million

Reprinted from The Iron Age of June 10, 1948

GALLAND-HENNING MFG. CO.
2747 S. 31st STREET MILWAUKEE 7, WISCONSIN

GALLAND-HENNING

SCRAP METAL BALING PRESSES

A 5473-1P

NONFERROUS METALS

. . . News and Market Activities

Lead Leads in General Price Decline of Metal Scrap Market

New York

• • • **Price declines** in the metal scrap market were general last week, affecting copper and brass, grades, zinc, lead and type metals. The heaviest declines were registered in lead, which dropped 2¢ per lb based on the establishment of a $20 a ton smelting charge. Type metals dropped 1¢, and copper, brass and zinc scrap dropped by ½¢ per lb.

An outgrowth of the easier scrap market was a reduction of the price schedule of White Bros. Smelting Corp. for ingot brass and bronze. Effective Dec. 13, prices of quoted grades were reduced by ½¢ per lb except No. 245, reduced 1¢.

The easier scrap market reflects less anxiety by consumers to cover metal requirements even from the scrap market under high-priced conversion arrangements. Although scrap prices are still above the levels which would permit custom smelters to buy freely on the open market in order to sell at domestic primary metal prices, if followed through in weeks to come by further scrap market declines, the market should return to a more normal price relationship. Custom smelters are beginning to breathe a little more easily about their current operational problems.

The consumers who have been bidding up market prices are generally those whose requirements are small compared to the value of their finished products. Other consumers have been forced to pull in their belts and reduce operations within the limits of available tonnages.

Primary metals are still in very short supply. So far producers have been able to hold prices at established levels by spreading available tonnages among consumers as carefully as possible. Premium prices being paid for secondary or foreign copper, lead and zinc are dropping, due to the growing resistance of consumers. It would appear that the major producers of metals have been successful in preventing further price increases

Producers Divvy Tight Primary Metals Carefully to Hold Established Prices

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An encouraging factor in the copper market lies in the current meeting between officials of Kennecott and those of the Brotherhood of Enginemen. Trade factors report that there is a growing attitude of conciliation between the two groups. The union started out with a demand of $4.07 a day, which has since been trimmed to around $2.70. Kennecott's original offer was 12¢ an hour, 96¢ a day. Early this week the meetings were still in progress. When an agreement is reached, mine production should be started in two weeks. But it will be a matter of two to three months before operations will be back to normal again. In the meantime, the strike is in its eighth week and copper production lost averages 24,000 tons a month.

There is no further development in the strike at the zinc producing plants of American Zinc, Lead & Smelting Co. This strike has continued since mid-August at a total cost to date estimated at 10,000 tons of zinc. The zinc market continues in short supply under the pressure of consumers of all grades and the stockpiling program.

The buying pressure is off the secondary lead market and the drop in prices has been reflected in lower scrap prices. Unseasonably warm weather has affected demand for antimonial lead, as the replacement battery market is off. The longshoremen's strikes held up shipments for a time, but tonnages on the water were heavy and have been coming into the market to help relieve the shortage. Operations at lead consuming plants have had to be reduced on the basis of tonnages available. As one observer puts it, December is a good month for slow downs, to provide for holidays and inventory taking.

Nonferrous Metals Prices

	Dec. 8	Dec. 9	Dec. 10	Dec. 11	Dec. 13	Dec. 14
Copper, electro, Conn.	23.50	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	$1.03	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	21.30	21.30	21.30	21.30	21.30	21.30

Heads Gas and Fuel Div. Within Chemical Society

• • • **Dr. G. Robert Yohe,** head of the coal division of the Illinois State Geological Survey, Urbana, Ill., has been elected chairman of the Div. of Gas and Fuel Chemistry of the American Chemical Society.

He succeeds Dr. Calvert C. Wright, chief of the division of fuel technology of the Pennsylvania State College School of Mineral Industries, who, with Dr. Yohe, represents the Div. of Gas and Fuel Chemistry on the Society's National Council.

Dr. Ralph E. Brewer, a chemical engineer with the Central Experiment Station of the U. S. Bureau of Mines, Pittsburgh, was chosen chairman-elect. He is an alternate divisional representative on the Society's Council. Henry Hakewill, Jr. of the Institute of Gas Technology, Chicago, is the other alternate councilor.

Dr. H. Beecher Charmbury, associate professor of fuel technology at Penn State, was re-elected secretary-treasurer of the Div.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$110 to $115
Lead, St. Louis	21.30
Lead, New York	21.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$79 to $81
Nickel, electro, f.o.b. New York	42.90
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$93 to $96
Silver, New York, cents per oz.	70.00
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	17.50
Zinc, New York	18.15
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	21.00*	22.00
No. 120	20.50*	21.50
No. 123	20.00*	21.00
80-10-10 ingot		
No. 305		27.25
No. 315		24.25
88-10-2 ingot		
No. 210		33.00
No. 215		31.00
No. 245	24.75*	25.75
Yellow ingot		
No. 405	17.00*	17.50
Manganese bronze		
No. 421		23.00

* F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	31.25–31.75
0.60 copper, max.	30.75–31.25
Piston alloys (No. 122 type)	26.50–27.00
No. 12 alum. (No. 2 grade)	26.25–26.75
108 alloy	26.50–27.00
195 alloy	27.00–27.25
13 alloy	31.00–31.50
AXS-679	27.25–27.75

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct-95½ pct	28.75–29.50
Grade 2—92 pct-95 pct	27.75–28.50
Grade 3—90 pct-92 pct	26.75–27.50
Grade 4—85 pct-90 pct	26.25–26.75

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	40⅛
Electrodeposited	34⅜
Rolled, oval, straight, delivered	37.34
Ball anodes	38⅜
Brass, 80-20	
Cast, oval, 15 in. or longer	35⅞
Zinc, oval, 99.99	
Ball anodes	
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	
Cadmium	$2.10
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5 crystals, bbls.	9.10
Nickel salts, single or double, 100 lb bags, frt. allowed	18.50
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 100 lb drums	16.00
Zinc sulfate, crystals, 22.5 pct, bags	
Zinc sulfate, 25 pct, granules, bbls. frt. allowed	

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4; 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to $1.07; 35 to 37, 45.7¢ to $1.65; 47 to 49, 67.5¢ to $2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅜ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft. per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks		40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78	..	37.18
Copper, hot-rolled	..	33.03	..
Copper, drawn	..	34.28	..
Low brass	38.57*	35.35	35.66
Yellow brass	37.60*	34.28	34.59
Red brass	38.92*	35.70	36.01
Naval brass	34.90	33.65	39.59
Leaded brass	..	29.24	..
Commercial bronze	39.54*	36.57	36.88
Manganese bronze	38.49	36.99	43.09
Phosphor bronze, 5 pct	57.80*	56.30	56.05
Muntz metal	34.47	33.22	37.66
Everdur, Herculoy, Olympic, etc.	40.49	40.76	41.82
Nickel silver 10 pct	..	47.17	44.77
Architectural bronze	33.42	..	..

* Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 lb or more)

	Heavy	Turnings
Copper	21⅛	20⅜
Yellow brass	18⅞	18⅛
Red brass	20	19¼
Commercial bronze	20⅛	19⅜
Manganese bronze	18¾	17⅞
Leaded brass rod ends	18⅛	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper wire	21.00–21.50
No. 2 copper wire	20.00–20.50
Light copper	19.00–19.50
Refinery brass	19.00–19.25

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	19.75
No. 2 copper, wire	18.75
Light copper	17.75
No. 1 composition	16.50–16.75
No. 1 comp. turnings	16.25–16.50
Rolled brass	12.75–13.25
Brass pipe	13.25–13.75
Radiators	14.00–14.50
Heavy yellow brass	12.50–12.75
Aluminum	
Mixed old cast	16.50
Mixed old clips	16.75
Mixed turnings, dry	14.50
Pots and pans	16.75
Low copper	19.00

Dealers' Scrap

(Dealer's buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	19 —19½
No. 2 heavy copper and wire	18 —18½
Light copper	17 —17½
Auto radiators (unsweated)	12¼—12½
No. 1 composition	14½—15
No. 1 composition turnings	14 —14½
Clean red car boxes	12 —12½
Cocks and faucets	12 —12½
Mixed heavy yellow brass	9 — 9½
Old rolled brass	11½—12
Brass pipe	13 —13½
New soft brass clippings	15 —15½
Brass rod ends	13 —13½
No. 1 brass rod turnings	12½—13

Aluminum

Alum. pistons and struts	8½— 9
Aluminum crankcases	12½—13
2S aluminum clippings	16½—17
Old sheet & utensils	12½—13
Borings and turnings	6 — 6½
Misc. cast aluminum	12½—13
Rural clips (24S)	12½—13

Zinc

New zinc clippings	11 —11½
Old zinc	9½—10
Zinc routings	5¼— 5¾
Old die cast scrap	6¼— 6¾

Nickel and Monel

Pure nickel clippings	22 —23
Clean nickel turnings	17 —18
Nickel anodes	22 —23
Nickel rod ends	21 —22
New Monel clippings	15½—16½
Clean Monel turnings	11 —12
Old sheet Monel	13 —14
Old Monel castings	10 —11
Inconel clippings	12 —13
Nickel silver clippings, mixed	8 — 8½
Nickel silver turnings, mixed	7 — 7½

Lead

Soft scrap lead	18 —18½
Battery plates (dry)	12 —12½

Magnesium Alloys

Segregated solids	8 — 9
Castings	4½— 5½

Miscellaneous

Block tin	82 —84
No. 1 pewter	65 —67
No. 1 auto babbitt	51 —53
Mixed common babbitt	19 —19½
Solder joints	21½—22½
Siphon tops	50 —52
Small foundry type	20½—21
Monotype	19½—20
Lino. and stereotype	19 —19½
Electrotype	17½—18
New type shell cuttings	15½—16
Hand picked type shells	6½— 7
Lino. and stereo dross	10½—11
Electro dross	7 — 7½

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Cast Grades Slip in Major Market Areas

New York

• • • **Cast grades in** the major market areas took a dip downward this week. At the same time the heavy melting grades remained firm at current price levels and shipments continued in surprising volume. The drop in cast grades is attributed to both a better supply of cast iron scrap, due possibly to small job foundries dropping out of the market, better inventories at big shops than they have had for some time and closing out of inventories for the year.

Although there is a definite weakness in the cast market generally, sources point out that the end of the year and the beginning of a winter season are poor times to foresee a definite downward trend in the market. They feel that definite price tests will come after the first of the year instead.

In Buffalo cast grades dropped $2 to $3 with mixed yard cast going at $63 to $66, the lowest level in several months. In other areas, however, the decline was not so severe.

Mixed yard cast slipped $1 in Pittsburgh. In Chicago No. 1 machinery cast was down $1 with cast iron brake shoes and car wheels down the same while No. 1 machinery cast flopped $2. A similar cast situation exists in Philadelphia, Detroit and Cleveland.

Cancellation of a few conversion ingot orders in the Cleveland area following recent seasonal layoffs in the home appliance industry is momentarily a big psychological factor in the Valley scrap market.

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PITTSBURGH—New business during the past week was almost nonexistent. Some companies are reportedly tapering off on buying for inventory reasons, but one of the largest simply has no more room to lay down material. The trade is watching price resistance in Chicago with the feeling that if there is any weakness there it will be quickly reflected here. Year-end softness is not surprising to scrap men but they say that breaks of any size don't usually come at the beginning of winter. Reflecting some decline in foundry business, mixed yard cast was off $1. In steel foundry material the only change was a decline of $1.50 in railroad springs wiping out the differential which these items recently made over knuckles and couplers and steel wheels.

CHICAGO—The usual year end slump has permeated the market. Very little activity took place last week. Railroad specialties showed a little weakness on practically all items but rerollers. Most traders regard the market as weak. They believe early January will probably see a weaker price in dealer scrap. Only two mills in the area are still accepting dealer scrap.

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PHILADELPHIA — The undertone of the market in this district last week was easier, but there are no changes in heavy melting prices. Cast grades were easy and lower prices were reported. Pipe foundries have held up shipments. Low phos grades are reported to be easier. The shovelings market is stronger and one consumer is buying for delivery this month at $41.50. Buyers are out of the chemical borings market till the end of the year and the price is quoted as nominal.

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CLEVELAND—Cancellation of a few conversion ingot orders following recent layoffs in the home appliance industry is momentarily a big psychological factor in the scrap market here and in the Valley. Mills are backing off until they know where, if anyplace, the market is going. In the meantime, more scrap is moving at market levels than even the balmiest brokers would have thought possible a few months ago, and it is possible that many of the major mills will drop out of the market after the first of the year for a definite price test. At the moment steel grades are holding along with rails, but the foundry grades are off. Shipments of all grades this month have been unusually good, but this may be due to the weather more than anything else. But there is a feeling, perhaps no more reliable than most feelings, that if this were January and not December a price break would be in the offing. In any event, the market has been alerted. Everybody has orders, and a few at over market levels. But prices remain static and the general tone of the market is weak.

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DETROIT—The tone of the scrap market here is soft although adherence to market prices has restricted pricewise movements. Another factor tending to hold prices up is the large differentials compared with other scrap centers. Turnings is a good example. While top grade turnings out of plants continue to bring $3 under market level here, yard material has sold as low as $31 delivered and some sources see even lower prices in the offing. Another recent development here is the entry of a large automobile firm into the cast market as many of Detroit's jobbing foundries are pulling out.

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CINCINNATI — Foundry grades are weaker, a development which brokers are inclined to ascribe to either the season or the inventory condition of the plants, or even the sentiment of a business readjustment, which is creeping into the market here. Trade sources, however, anticipate a stronger market for foundry and cast grades after the first of the year. Demand for openhearth grades is unchanged and movement at market prices is good. Some consumers in this area have made some new qualitative and quantitative restrictions on low phos which would seem to be evidence that their position is stronger, but dealers are still scrambling to get scrap.

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NEW YORK—There is no change in prices in this market. The heavy melting demand is strong and shipments continue to move in good volume there. There is, however, a sentiment of weakness in the cast grade market although it is not strong enough to show lower prices. Some of the job foundries are out of the market and since big consumers see more scrap and at the same time have closed out inventories for the year, the current feeling results. The clean cast chemical boring market is still out of the picture and prices quoted are strictly nominal.

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BIRMINGHAM—Very little change in trend is to be found currently in this market. A slight increase in receipts of agricultural scrap is being noted at dealer's yards but the added volume is yet to become substantial and has done nothing to soften prices for cast grades. Prices are firm but unchanged for all grades. Steel scrap supplies are ample to meet requirements.

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BOSTON — Though brokers report a slowdown in activity, they also have announced several price changes. No. 1 steel is bringing a better price, selling as high in a few cases as $40. However, the average spread is $37 to $38.90 but many sales at the latter figure. Other scrap is quoted from market level to a $1 or more higher. In cast, heavy breakable and stove plate have dropped around $2. The price quoted on clean cast chemical borings for chemical purpose is only nominal since there is no demand for this grade for that purpose. However, some sales of this grade are being made at lower prices for steelmaking uses.

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BUFFALO—Cast prices were reduced $2 to $3 a ton but elsewhere the market was firm to strong. Mixed yard cast dropped to the lowest level in several months at $63 to $66 and other items showed proportionate losses. Activity was almost entirely on a spot basis as dealers shied away from future commitments until the price control possibilities are out of the way with the new Congress coming into power. Blast furnace scrap continued unusually active and strong.

•

ST. LOUIS—The usual holiday lull prevails in the scrap iron market in the St. Louis industrial district. The steel mills are out of the market for the remainder of 1948, with comfortable inventories. Conversion deals are said to be easing up.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to $43.00
RR. hvy. melting	43.50 to 44.00
No. 2 hvy. melting	42.50 to 43.00
RR. scrap rails	58.00 to 59.00
Rails 2 ft and under	62.00 to 62.50
No. 1 comp'd bundles	42.50 to 43.00
Hand bdld. new shts.	42.50 to 43.00
Hvy. axle turn.	45.50 to 46.50
Hvy. steel forge turn.	45.50 to 46.50
Mach. shop turn.	37.50 to 38.00
Shoveling turn.	39.00 to 40.00
Mixed bor. and turn.	37.50 to 38.00
Cast iron borings	39.50 to 40.00
No. 1 mach. cast	69.50 to 70.50
Mixed yard cast	64.00 to 65.00
Hvy. breakable cast	62.00 to 63.00
Malleable	76.00 to 77.00
RR. knuck. and cup.	57.00 to 58.00
RR. coil springs	57.00 to 58.00
RR. leaf springs	57.00 to 58.00
Rolled steel wheels	57.00 to 58.00
Low phos.	49.50 to 50.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.50 to $42.00
No. 2 hvy. melting	41.50 to 42.00
No. 1 bundles	41.50 to 42.00
No. 2 dealers' bundles	41.50 to 42.00
Bundled mach. shop turn.	41.50 to 42.00
Galv. bundles	39.50 to 40.00
Mach. shop turn.	36.50 to 37.00
Short shov. turn.	38.50 to 39.00
Cast iron borings	37.50 to 38.00
Mix. borings and turn.	36.50 to 37.00
Low phos. hvy. forge	51.00 to 52.00
Low phos. plates	49.00 to 50.00
No. 1 RR. hvy. melt.	44.25 to 50.00
Rerolling rails	73.00 to 74.00
Miscellaneous rails	64.00 to 65.00
Angles & splice bars	57.00 to 58.00
Locomotive tires, cut	58.00 to 59.00
Cut bolster & side frames	52.00 to 53.00
Standard stl. car axles	84.00 to 86.00
No. 3 steel wheels	52.00 to 53.00
Couplers and knuckles	53.00 to 54.00
Rails, 2 ft and under	60.00 to 62.50
Malleable	83.00 to 84.00
No. 1 mach. cast	69.00 to 71.00
No. 1 agricul. cast	63.00 to 64.00
Heavy breakable cast	60.00 to 62.00
RR. grate bars	60.00 to 61.00
Cast iron brake shoes	59.00 to 60.00
Cast iron car wheels	64.00 to 65.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turn.	37.00 to 38.00
Cast iron borings	36.00 to 37.00
Mixed bor. & turn.	35.00 to 36.00
Low phos., 18 in. under	48.00 to 49.00
No. 1 cupola cast.	65.00 to 66.00
Hvy breakable cast	59.00 to 60.00
Rails 18 in. and under	61.00 to 63.00
Rails random length	56.00 to 57.00
Drop broken	69.00 to 70.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.00 to $38.90
No. 2 hvy. melting	34.40 to 36.50
Nos. 1 and 2 bundles	34.40 to 36.50
Bushelings	34.40 to 36.50
Shoveling turn.	31.40 to 32.50
Machine shop turn.	29.40 to 31.00
Mixed bor. and turn.	29.40 to 31.00
Cl'n cast chem. bor.	nominal
No. 1 machinery cast.	64.00 to 65.00
No. 2 machinery cast.	57.00 to 59.00
Heavy breakable cast.	52.50
Stove plate	54.50 to 55.50

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	38.00
No. 1 bundles	38.00
New busheling	38.00
Flashings	38.00
Mach. shop turn.	$32.50 to 33.00
Machinery cast	61.00 to 63.00
Mixed yard cast	57.00 to 58.00
Shoveling turn.	31.50 to 32.00
Cast iron borings	32.50 to 33.00
Mixed bor. & turn.	31.50 to 32.00
Low phos. plate	42.50 to 43.00
Heavy breakable cast.	53.00 to 57.00
Stove plate	57.00 to 58.00
Automotive cast.	64.00 to 66.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	41.00 to 41.50
No. 1 bundles	44.00 to 45.00
No. 2 bundles	41.00 to 41.50
Mach. shop turn.	37.00 to 38.00
Shoveling turn.	41.00 to 41.50
Mixed bor. and turn.	36.75 to 37.25
Clean cast chemical bor.	nominal
No. 1 machinery cast.	65.00 to 66.00
No. 1 mixed yard cast.	60.00 to 61.00
Hvy. breakable cast.	61.00 to 62.00
Hvy. axle forge turn.	46.00 to 47.00
Low phos. acid, openhearth	49.00 to 50.00
Low phos., electric furnace	51.00 to 52.00
Low phos. bundles	47.00 to 48.00
RR. steel wheels	54.00 to 55.00
RR. coil springs	54.00 to 55.00
RR. malleable	80.00 to 82.00
Cast iron carwheels	68.00 to 70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	40.00 to 41.00
Bundled sheets	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turnings	37.00 to 38.00
Locomotive tires, uncut	47.00 to 48.00
Mis. std. sec. rails	57.00 to 58.00
Steel angle bars	55.00 to 57.00
Rails 3 ft and under	60.00 to 62.00
RR. steel springs	50.00 to 51.00
Steel car axles	73.00 to 75.00
Brake shoes	56.00 to 57.00
Malleable	77.00 to 78.00
Cast iron car wheels	65.00 to 66.00
No. 1 machinery cast.	66.00 to 67.00
Hvy. breakable cast.	60.00 to 61.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	40.00
No. 2 bundles	40.00
No. 1 bunsheling	40.00
Long turnings	$32.00 to 33.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	29.50
Bar crops and plate	44.00 to 45.00
Structural and plate	44.00 to 45.00
No. 1 cupola cast.	71.00 to 73.00
Stove plate	65.00 to 67.00
No. 1 RR. hvy. melt.	41.00
Steel axles	51.00 to 52.00
Scrap rails	44.00 to 45.00
Rerolling rails	65.00 to 67.00
Angles & splice bars	53.00 to 54.00
Rails 3 ft & under	53.00 to 54.00
Cast iron carwheels	63.00 to 64.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to $43.00
No. 2 hvy. melting	42.50 to 43.00
Mach. shop turn.	37.50 to 38.00
Short shov. turn.	39.00 to 40.00
Cast iron borings	38.00 to 39.00
Low phos.	47.50 to 48.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.50 to $39.00
No. 2 hvy. melting	37.00
No. 2 bundles	37.00
Mach. shop turn.	31.50 to 32.00
Mixed bor. & turn.	31.50 to 32.00
Shoveling turnings	33.50 to 34.00
Machinery cast.	59.00 to 60.00
Mixed yard cast	57.00 to 58.00
Heavy breakable cast.	56.00 to 57.00
Charging box cast.	56.00 to 57.00
Unstrp. motor blks.	53.50 to 54.50
Cl'n cast chem. bor.	nominal

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	41.75 to 42.25
No. 1 bundles	41.75 to 42.25
No. 2 bundles	41.75 to 42.25
No. 1 busheling	41.75 to 42.25
Mach. shop turn.	36.75 to 37.25
Shoveling turn.	38.75 to 39.25
Cast iron borings	37.75 to 38.25
Mixed bor. and turn.	36.75 to 37.25
Clean auto. cast.	67.00 to 68.00
Mixed yard cast.	63.00 to 65.00
Stove plate	63.00 to 65.00
Mlt. malleable	70.00 to 75.00
Small indus. malleable	47.00 to 49.00
Low phos. plate	48.00 to 50.00
Scrap rails	.... 58.00
Rails 3 ft & under	63.00 to 64.00
RR. steel wheels	56.00 to 58.00
RR. coil & leaf spgs.	56.00 to 58.00
RR. knuckles & coup.	56.00 to 58.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.00 to $42.50
No. 2 hvy. melting	42.00 to 42.50
No. 1 bundles	42.00 to 42.50
No. 1 busheling	42.00 to 42.50
Drop forge flashings	42.00 to 42.50
Mach. shop turn.	37.00 to 37.50
Shoveling turn.	38.50 to 39.50
Steel axle turn.	42.00 to 42.50
Cast iron borings	37.50 to 38.50
Mixed bor. & turn.	36.50 to 37.50
Low phos. 2 ft and under	47.00 to 47.50
No. 1 machinery cast.	72.00 to 74.00
Malleable	79.00 to 81.00
RR. cast.	75.50 to 77.00
Railroad grate bars	58.00 to 61.00
Stove plate	61.00 to 63.00
RR. hvy. melting	43.00 to 43.50
Rails 3 ft and under	63.50 to 64.50
Rails 18 in. and under	65.00 to 66.00

SAN FRANCISCO

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	$27.50
No. 2 hvy. melting	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	18.00
Elec. fur. 1 ft under	$40.00 to 42.00
No. 1 cupola cast.	58.00 to 60.00
RR. hvy. melting	28.50
Rails	29.00

LOS ANGELES

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	$27.50
No. 2 hvy. melting	27.50
No. 1 bales	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	20.00
Elec. fur. 1 ft under	$40.00 to 42.00
No. 1 cupola cast.	58.00 to 68.00
RR. hvy. melting	28.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$30.00 to $33.00
Elec. fur. 1 ft and under	40.00 to 42.00
No. 1 cupola cast.	50.00 to 54.00
RR. hvy. melting	30.00 to 33.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point:

Heavy melting	$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechanical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.50*
Bushelings, new fact, prop'd	21.00*
Bushelings, new fact, unprop'd	16.00*
Short steel turnings	17.00*
No. 1 cast	$48.00 to 50.00*
No. 2 cast	44.00 to 45.00*

*Ceiling Price

Comparison of Prices . .

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Dec. 14, 1948	Dec. 7, 1948	Nov. 16, 1948	Dec. 16, 1947
Hot-rolled sheets	3.26	3.26	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.265	3.265	3.265	2.80
Cold-rolled strip	4.063	4.063	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron	7.85	7.85	7.85	6.85
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$6.80	$6.80	$6.80	$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	6.00	5.05
Special coated mfg. ternes	5.90	5.90	5.90	4.90
Bars and Shapes: (cents per pound)				
Merchant bars	3.37	3.37	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	7.15
Wire: (cents per pound)				
Bright wire	4.256	4.256	4.256	3.55
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$2.75
Light rails	3.55	3.55	3.55	3.10
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$45.00†
Slabs, rerolling	52.00	52.00	52.00	45.00†
Forging billets	61.00	61.00	61.00	55.00†
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00†
Wire rod and Skelp: (cents per pound)				
Wire rods	3.619	3.619	3.619	2.80
Skelp	3.25	3.25	3.25	2.60

† Gross ton

Pig Iron: (per gross ton)	Dec. 14, 1948	Dec. 7, 1948	Nov. 16, 1948	Dec. 16, 1947
No. 2, foundry, Phila.	$51.56	$51.56	$51.56	$40.97
No. 2, Valley furnace	46.50	46.50	46.50	36.50
No. 2, Southern Cin'ti	49.47	49.47	49.47	40.24
No. 2, Birmingham	43.38	43.38	43.38	34.88
No. 2, foundry, Chicago†	46.00	46.00	46.00	36.00
Basic del'd Philadelphia	50.76	50.76	50.76	40.47
Basic, Valley furnace	46.00	46.00	46.00	36.00
Malleable, Chicago†	46.50	46.50	46.50	36.50
Malleable, Valley	46.50	46.50	46.50	36.50
Charcoal, Chicago	73.78	73.78	73.78	56.04
Ferromanganese‡	161.71	161.71	161.71	145.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ Average of U. S. prices quoted on Ferroalloy page.

Scrap (per gross ton)				
Heavy melt'g steel, P'gh.	$42.75	$42.75	$42.75	$40.00
Heavy melt'g steel, Phila.	44.50	44.50	44.50	40.50
Heavy melt'g steel, Ch'go	41.75	41.75	41.75	38.75
No. 1, hy. comp. sh't, Det.	38.00	38.00	38.00	34.75
Low phos. Young'n	47.75	47.75	47.75	47.25
No. 1, cast, Pittsburgh	70.00	70.00	70.00	53.50
No. 1, cast, Philadelphia	*65.50*	66.50	66.50	53.50
No. 1, cast, Chicago	*70.00*	71.00	72.50	63.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.00	$15.00	$15.00	$12.50
Foundry coke, prompt	17.00	17.00	17.00	14.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	23.50	23.50	23.50	21.50
Copper, Lake Conn.	23.625	23.625	23.625	21.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	80.00
Zinc, East St. Louis	17.50	17.50	17.50	10.50
Lead, St. Louis	21.30	21.30	21.30	14.80
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.90	42.90	42.90	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	33.00

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1945, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
Dec. 14, 1948	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One week ago	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One month ago	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One year ago	3.19541¢ per lb.	$37.06 per gross ton	$39.75 per gross ton

	HIGH	LOW
1948	3.75700¢ July 27	3.22566¢ Jan. 1
1947	3.19541¢ Oct. 7	2.87118¢ Jan. 7
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1
1945	2.44104¢ Oct. 2	2.54490¢ Jan. 2
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943	2.29176¢	2.29176¢
1942	2.28249¢	2.28249¢
1941	2.43078¢	2.43078¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933	1.95578¢ Oct. 3	1.75836¢ May 2
1932	1.89196¢ July 5	1.83901¢ Mar. 1
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

	HIGH	LOW
1948	$46.82 Oct. 12	$39.58 Jan. 6
1947	37.98 Dec. 30	30.14 Jan. 7
1946	30.14 Dec. 10	25.37 Jan. 1
1945	25.37 Oct. 23	23.61 Jan. 2
1944	$23.61	$23.61
1943	23.61	23.61
1942	$19.17	$19.17
1941	19.17	19.17
1940	$23.61 Mar. 20	$23.45 Jan. 2
1939	23.45 Dec. 23	22.61 Jan. 2
1938	22.61 Sept. 19	20.61 Sept. 12
1937	23.25 June 21	19.61 July 6
1936	23.25 Mar. 9	20.25 Feb. 16
1935	19.74 Nov. 24	18.73 Aug. 11
1934	18.84 Nov 5	17.83 May 14
1933	17.90 May 1	16.90 Jan. 27
1932	16.90 Dec. 5	13.56 Jan. 3
1931	14.81 Jan. 5	13.56 Dec. 6
1930	15.90 Jan. 6	14.79 Dec. 15
1929	18.21 Jan. 7	15.90 Dec. 16
1928	18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
1948	$43.16 July 27	$39.75 Mar. 9
1947	42.58 Oct. 28	29.50 May 20
1946	31.17 Dec. 24	19.17 Jan. 1
1945	19.17 Jan. 2	18.92 May 22
1944	19.17 Jan. 11	15.76 Oct. 24
1943	$19.17	$19.17
1942	19.17	19.17
1941	$22.00 Jan. 7	$19.17 Apr. 10
1940	21.83 Dec. 30	16.04 Apr. 9
1939	22.50 Oct. 3	14.08 May 16
1938	15.00 Nov. 22	11.00 June 7
1937	21.92 Mar. 30	12.67 June 9
1936	17.75 Dec. 21	12.67 June 8
1935	13.42 Dec. 10	10.33 Apr. 29
1934	13.00 Mar. 13	9.50 Sept. 25
1933	12.25 Aug. 8	6.75 Jan. 3
1932	8.50 Jan. 12	6.43 July 5
1931	11.33 Jan. 6	8.50 Dec. 29
1930	15.00 Feb. 18	11.25 Dec. 9
1929	17.58 Jan. 29	14.08 Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb. deduct 20¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00														
Alloy	$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS Carbon, rerolling[12]	$52.00				$52.00	$52.00	(per net ton)						$52.00		
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)						$61.00		
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren =3.25				
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.65	3.50			Worcester 3.70		3.40	4.05[13] 4.10[14]	
SHEETS Hot-rolled[6]	3.25 to 3.30	3.25	3.25	3.25–3.30	3.25	3.25	3.25	3.25		Warren, Ashland =3.25		3.45		3.95[15]	5.65
Cold-rolled[1]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.70	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton =4.40	4.40	Ashland =4.40			5.15[15]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes[2] (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[3]	3.25 to 3.30	3.25 to 3.30	3.25	3.25 to 3.30	3.25	3.25	3.25	3.25		3.25	Warren =3.25	3.45		4.00 to 4.25	5.90
Cold-rolled[4]	4.00	4.25		4.00	4.00	4.00	4.00	4.00		New Haven 4.50 Warren =4.00 to 4.25		4.20 to 4.50			7.10
TINPLATE Cokes, 1.50 lb.[5] base box	$6.80	$6.80	$6.80		$6.90			$6.90	$7.00	Warren, Ohio =$6.80				Pittsburg, Cal. =$7.55	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.00, 80¢ and 60¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct 90¢ from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55-70 lb, 75-95 lb, 100-128 lb	Deduct $1.60, $1.70 and $1.60 respectively from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[10]	4.75	4.75	4.75					4.85							
BARS Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton =3.35	3.55	3.35	4.05 to 4.10	5.30
Reinforcing (billet)[7]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton =3.35		3.35	4.05 to 4.10	5.30
Cold-finished[8]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon =3.75				4.05	3.75	4.80[14]	5.50
Alloy cold-drawn	4.65 to 4.75	4.65	4.65	4.65		4.65	4.65	Massillon =4.65			Worcester 4.95				
PLATE Carbon steel[11]	3.40 to 3.60	3.40	3.40	3.40 to 3.60	3.40	3.45	3.40	3.45 Coatesville =3.75, Claymont =3.95 Geneva =3.40, Harrisburg =6.50				3.65	3.45	4.30[16]	5.80
Floor plates	4.55	4.55		4.55	Conshohocken =4.55										
Alloy	4.40	4.40							Coatesville =6.10						
SHAPES, Structural	3.25 to 3.30	3.25	3.25		3.25	3.30	Bethlehem =3.30, Geneva, Utah =3.25						3.30	3.85 to 4.30	5.75
MANUFACTURERS' WIRE[9] Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.15	4.25	Duluth =4.15, Worcester =4.45				4.15	5.15[13]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester =5.50 New Haven, Trenton =5.50				5.20	Duluth = 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel						Straight Chromium		
	301	302	303	304	316	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	26.75	15.00	18.50	15.25
Forging discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	41.00	24.50	25.00	25.00
Billets, forging	24.25-26.50	24.25-26.50	26.25-28.75	25.50-27.75	39.00-42.75	32.75-35.75	19.50-21.50	20.00-21.75	20.00-21.75
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	44.00	26.00	26.50	26.50
Sheets	37.50-40.75	37.50-40.75	39.50-43.00	39.50-43.00	53.00-57.25	50.00-54.00	33.00	33.50	35.50 .....
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50-30.75	33.00-33.50	36.50-39.50	35.00-35.75	55.00-57.25	48.50-50.00	27.00	33.50	27.50 .....

ELECTRODES

Cents per lb, f.o.b. plant, threade electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium ..... 52¢
Oil harden manganese ..... 29¢
Special carbon ..... 26.5¢
Extra carbon ..... 22¢
Regular carbon ..... 19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

Base, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70 to 9.20
Dynamo	7.50 to 10.00
Transformer 72	8.05 to 11.80
Transformer 65	8.60 to 12.35
Transformer 58	9.30 to 13.05
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb ..... $3.20†
Joint bars, 100 lb 4.25
Light rails (from billets) per 100 lb 3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburg, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.
† CF&I $3.35; Inland $3.50.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon ..... 4.00¢
0.41 to 0.60 carbon ..... 5.50¢
0.61 to 0.80 carbon ..... 6.10¢
0.81 to 1.05 carbon ..... 8.05¢
1.06 to 1.35 carbon ..... 10.35¢
Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

Stainless clad	Plate	Sheet
No. 304, 20 pct, f.o.b.		
Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville.	36.00	
Monel-clad		
10 pct, f.o.b. Coatesville.	29.00	
Alumnized steel sheets		
Hot dip, 20 gage, f.o.b. Butler, Pa.	....	9.25

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	132
Fence posts, carloads††	114	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire†	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.20	5.65
Sheets									
Hot-rolled	4.95	4.95	4.95	5.25	4.95	4.95	4.95	4.95	5.25
Cold-rolled	6.05	6.05	6.05	....	6.05	6.05	6.05	6.05	6.35
Galvanized	....	6.75	....	....	....	6.75	....	....	....
Strip									
Hot-rolled	4.95	4.95	4.95	....	4.95	4.95	4.95	4.95	5.25
Cold-rolled	....	....	6.05	....	....	6.05	6.05	....	6.35
Shapes	....	4.95	....	....	4.95	5.05	4.95	....	....
Beams	....	4.95	....	....	....	....	....	....	....
Bars									
Hot-rolled	5.10	5.10	5.10	....	5.10	5.10	5.10	....	5.40
Bar shapes	....	5.10	....	....	5.10	5.10	5.10	....	....

PIPE AND TUBING

Base discounts, f.o.b. mills, Base price, $200.00 per net ton.

STANDARD, THREADED AND COUPLED

Steel, buttweld	Black	Galv.
⅛-in.	43 to 41	20 to 18
¼-in.	46 to 44	24 to 22
1-in.	48½ to 46½	27 to 25
1¼-in.	49 to 47	27½ to 25½
1½-in.	49½ to 47½	28 to 26
2-in.	50 to 48	28½ to 26½
2½ to 3-in.	50½ to 49½	29 to 27
Steel, lapweld		
2-in.	39½	17½
2½ to 3 in.	39½	21½
3½ to 6 in.	46½ to 42	20½ to 24½
Steel, seamless		
2-in.	38½ to 27	16½ to 5
2½ to 3-in.	41½ to 35	19½ to 10½
3½ to 6-in.	43½ to 38½	21½ to 16½
Wrought Iron, buttweld		
⅛-in.	+20½	+52½
¼-in.	+10½	+41½
1 & 1¼-in.	+ 4½	+32½
2-in.	— 1½	+29
3-in.	— 2	+28½
Wrought Iron, lapweld		
2-in.	+ 7½	+36½
2½ to 3½-in.	+ 5	+32
4-in.	list	+26
4½ to 8-in.	+ 2	+27½

EXTRA STRONG, PLAIN ENDS

Steel, buttweld		
⅛-in.	42 to 40	20½ to 18½
¼-in.	46 to 44	24½ to 22½
1-in.	48 to 46	27½ to 25½
1¼-in.	48½ to 46½	28 to 26
1½-in.	49 to 47	28½ to 26½
2-in.	49½ to 47½	29 to 27
2½ to 3-in.	50 to 48	29½ to 27½
Steel, lapweld		
2-in.	39½	18½
2½ to 3-in.	44½	23½
3½ to 6-in.	48 to 44	23 to 27
Steel, seamless		
2-in.	37½ to 32½	16½ to 11½
2½ to 3-in.	41½ to 36½	20½ to 15½
3½ to 6-in.	45	24
Wrought Iron, buttweld		
⅛-in.	+16	+46½
¼-in.	+ 9½	+39½
1 to 2-in.	— 1½	+28½
Wrought Iron, lapweld		
2-in.	+ 4½	+33
2½ to 4-in.	— 5	+21½
4½ to 6-in.	— 1	+26

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD in.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	19.18	22.56	18.60	21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

Per net ton

4 to 24-in., del'd Chicago $106.70
6 to 24-in., del'd N. Y. ..... 103.50 to 108.40
6 to 24-in., Birmingham 93.50
4-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less 120.30

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quentities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)
Pct off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Set screws, oval points	19
Milled studs	5
Flat head cap screws, listed sizes	28
Fillister head cap, listed sizes	

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

Effective CaF, Content:	Base price per net ton
70% or more	$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, Bessemer	$6.60
Old range, nonbessemer	6.45
Mesabi, bessemer	6.35
Mesabi, nonbessemer	6.20
High phosphorus	6.20

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	19.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.75
Aluminum	30.00¢
Antimony	51.17¢
Brass, 10 ton lots	27.25 to 37.25¢
Copper, electrolytic	33.625¢
Copper, reduced	34.25¢
Cadmium	$2.55
Chromium, electrolytic, 99% min.	$3.50
Lead	27.80¢
Manganese	55.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	66.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.0¢
Tin	$1.155
Tungsten, 99%	$2.90
Zinc, 10 ton lots	17.75 to 22.25¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $18.00
Foundry, Byproduct Buffalo	$22.75 to $23.10
Chicago, del'd	23.90
Chicago, f.o.b.	20.85
Detroit, f.o.b.	19.40
New England, del'd	22.75
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	20.55
Swedeland, Pa., f.o.b.	20.50
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	19.95
Cleveland, del'd	22.45
Cincinnati, del'd	21.40
St. Paul, del'd	23.17
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
First quality, Pa., Md., Ky., Mo. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Chester	$69.00
Magnesite Brick	
Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00
Grain Magnesite	*Std. ⅜-in. grains*
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢	$12.25

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, per 100 lb.
(Metropolitan area delivery, add 15¢ to base, except New York, add 2½¢)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$5.15-5.71	$6.31-6.57	$7.27-7.52	$5.35-5.66	$6.51	$5.37-5.52	$5.09-5.24	$5.35-5.57	$6.16-6.31	$9.14	$9.29	$10.54	$10.69
New York	5.40-5.98	6.28-6.43	7.25-7.89	5.58-5.88	6.48-6.73	5.78	5.32-5.58	5.53-5.63	6.18-6.38	9.17-9.53	9.32-9.68	10.40-10.77	10.55-10.92
Boston	5.48-5.64	6.39	7.56-7.83	5.54-5.89	6.75-6.79	5.74	5.39-5.54	5.48-5.59	6.24-6.34	9.40-9.44	9.55-9.59	10.84-10.94	10.92-11.09
Baltimore	5.28	6.18	7.15-7.38	5.34	....	5.53	5.33-5.39	5.39	6.13	....	....	....	....
Chicago	4.85-5.10	5.75-5.95	7.15-7.30	4.85-5.30	6.15	5.10	4.90	4.90	5.70	9.35	9.60	10.80	11.05
Milwaukee	5.02-5.07	5.92	7.12-7.47	5.02-5.37	6.32	5.22-5.27	5.07	5.07	5.87	9.15-9.17	9.32	10.52-10.57	10.67-10.72
Norfolk	5.75	....	....	....	....	6.00	6.00	6.00	....	....	....	....	....
Cleveland	4.98-5.20	5.75[1]-6.04[1]	7.18-7.44	5.02-5.65	6.70	5.35-5.54	5.16-5.42	5.15-5.34	5.70-5.95	9.14-9.66	9.29-9.89	11.05	11.30
Buffalo	4.85	5.75	7.65	5.56	6.35	5.35	5.10	5.05	5.90	9.70	9.95	11.15	11.40
Detroit	5.20-5.55	6.05-6.50	7.70	5.25-5.70	6.25-6.55	5.50-5.55	5.30-5.37	5.30-5.52	6.02-6.07	9.31-9.55	9.20-9.47	10.72-10.95	10.87-11.10
Cincinnati	5.14-5.36[8]	5.82-6.21[8]	6.97-7.65	5.25-5.62[6]	6.31	5.50-5.71[8]	5.30-5.47[8]	5.30-5.62[8]	6.06-6.17[8]	9.31-9.35	9.50-9.51	10.75-10.76	10.90-10.91
St. Louis	5.19	6.04-6.09	7.29-7.64	5.19-5.79	6.49	5.39-5.44	5.24	5.24	6.04	9.69	9.94	11.14	11.39
Pittsburgh	4.85-4.90	5.75[1]	7.15	5.00-5.35	5.95	5.05-5.25	4.90-5.15	4.90-5.10	5.65-5.80	9.35	9.60	10.40	10.55-10.80
St. Paul	5.41	6.31	7.30-7.71	5.41	....	5.66	5.46	5.46	6.26	9.91	10.10	11.36	11.61
Omaha	5.92	....	9.18	5.92	....	6.17	5.97	5.97	6.77	....	....	....	....
Birmingham	5.05[1]	6.36	6.45	5.05[11]	6.36	5.25[11]	5.00[11]	5.00[11]	6.66	....	....	....	....
Houston	6.40	....	8.80	6.75	....	6.35	6.20	6.40	7.60	9.80	9.65	10.75	10.95
Los Angeles	6.30-6.40	7.85[1]-7.90	7.95-8.90	6.60-6.66	9.35[8]	6.10-7.40	5.75-5.90	6.05	7.85[15]-8.45	10.90	10.85	12.40	12.65
San Francisco	5.95[8]	7.15[2]	8.25-8.90	6.75[8]	8.25	6.30-7.60	5.90-6.90	5.90	7.55	10.90	10.85	12.40	12.65
Portland	6.50[4]	8.00[2]	8.15[2]-8.45[2]	6.85[4]	....	6.30[4]	6.25[4]	6.25[4]	8.25[4]	....	10.45[15]	....	12.05[15]
Seattle	6.20[4]-6.30[4]	7.75[2]-7.85[2]	7.65-8.00	6.55[4]-6.65[4]	....	6.20-6.30	6.15-6.25	6.05[4]-6.15[4]	8.00[14]-8.10[14]	....	10.30[15]-10.40[15]	....	12.00[15]-12.05[15]
Salt Lake City	7.05-8.00	8.20	7.90-9.06	7.10-7.59	....	5.75-6.65	6.65-7.00	6.95-7.25	7.55-8.40	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:
Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:
Sheets, 400 to 1999 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:
1000 to 1999 lb.

GALVANIZED SHEETS:
450 to 1499 lb.

EXCEPTIONS:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	....	....	....	....
Birmingham	42.88	43.38	....	....	....
Buffalo	47.00-48.00*	47.00-48.00*	47.50-48.50*	....	....
Chicago	46.00	46.50	46.50	47.00	....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	....
Erie	46.00	46.50	46.50	47.00	....
Everett	....	49.50	50.00	....	....
Granite City	47.90	48.40	48.90	....	....
Ironton, Utah	62.00	62.50	....	....	....
Lone Star, Texas	....	75.00†	....	....	....
Neville Island	46.00	46.50	46.50	....	....
Provo	46.00	46.50	....	....	....
Sharpsville	46.00	46.50	46.50	47.00	....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	....	....	....	....
Swedeland	50.00	50.50	51.00	51.50	....
Toledo	46.00	46.50	46.50	47.00	....
Troy, N. Y.	....	....	....	....	54.00
Youngstown	46.00	46.50	46.50	....	....

DELIVERED PRICES† (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	....	49.50	50.00	....	....
Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Bethlehem	3.90	51.90	....	....	....	....
Cincinnati	Birmingham	6.09	48.97	49.47	....	....	....
Jersey City	Bethlehem	2.39	50.39	....	....	....	....
Los Angeles	Provo	8.93	52.93	53.43	....	....	....
Mansfield	Cleveland-Toledo	3.03	49.03-48.53	49.53-49.03	49.53	50.03	54.03
Philadelphia	Bethlehem	2.21	50.21	....	....	....	....
Philadelphia	Swedeland	1.31	51.31	51.81	52.31	52.81	....
Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
San Francisco	Provo	8.93	52.93	53.43	....	....	....
Seattle	Provo	8.93	52.93	53.43	....	....	....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	....	....

* Republic Steel Corp. price: Basis: pig iron at Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Buffalo as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.
† Low Phos, Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —$59.50; f.o.b. Buffalo $60.75. Add $1.25 per ton for each additional 0.50 pct Si. up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $66.00 per gross ton, f.o.b. Lyles, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

FERROALLOY PRICES

Ferromanganese

78-82% Mn. Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham $162
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont. $160
F.o.b. Johnstown, Pa. $162
F.o.b. Sheridan, Pa. $160
F.o.b. Rockwood, Tenn. $165
F.o.b. Etna, Pa. $163

$2.00 for each 1% above 82% Mn; penalty, $2.00 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.0
Ton lots	11.6
Less ton lots	12.5

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$61.00	$62.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn.	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Ci	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C.

Carload bulk	8.60
Ton lots	10.25
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.0
Ton lots	11.6
Less ton lots	12.5

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct., f.o.b. Keokuk, Iowa, openhearth $84.00, foundry, $85.00; $84.75 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50 pct. Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	5.90
Ton lots	7.50
Less ton lots	8.40

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	17.50
50% Si	10.50
75% Si	13.00
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast Turnings		Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carload	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carload	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb. chromium contained packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb. of alloy, lump, delivered.

30-33% Ca, 60.65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7 Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound Contained V_2O_5	$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.75
Less ton lots	2.80
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	95¢
Calcium molybdate, 45-50%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide briquets, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide in bags, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti	$1.40
Less ton lots	1.45
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.40¢
Ton lots	9.30¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00
Ton lots, packed	11.25
Less ton lots	11.75

Boron Agents

Contract prices per pound of alloy, delivered.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D.	
Ton lot	$1.20
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. X D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y., freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$6.25